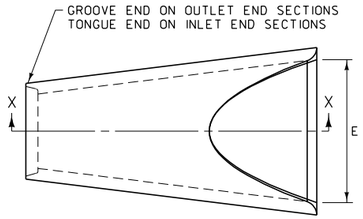
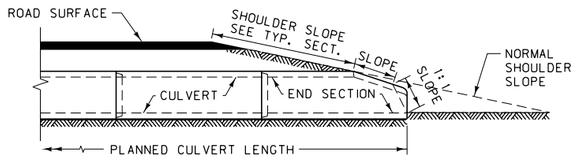
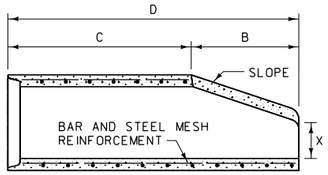
TYPE "A"



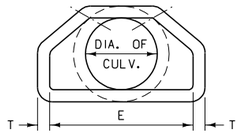
PLAN



SLOPE DETAIL



SECTION X-X

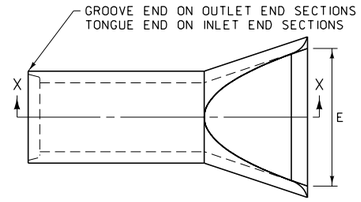


END VIEW

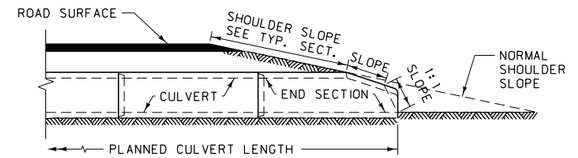
TYPE "A"							
DIA.	SLOPE	X	B	C	D	E	T *
300	2.4:1	101.6	609.6	1219.2	1828.8	609.6	50.8
375	2.4:1	152.4	685.8	1143.0	1828.8	762.0	57.2
450	2.3:1	228.6	685.8	1143.0	1828.8	914.4	63.5
600	2.5:1	241.3	1104.9	723.9	1828.8	1219.2	76.2
750	2.5:1	304.8	1371.6	457.2	1828.8	1524.0	88.9
900	2.5:1	381.0	1600.2	889.0	2489.2	1828.8	101.6
1050	2.5:1	533.4	1600.2	889.0	2489.2	1981.2	114.3
1200	2.5:1	609.6	1828.8	660.4	2489.2	2133.6	127.0
1350	2.0:1	685.8	1651.0	850.9	2501.9	2286.0	139.7

* WALL "B" THICKNESS

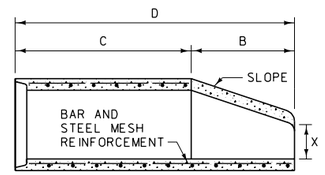
TYPE "B"



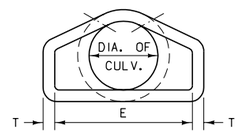
PLAN



SLOPE DETAIL



SECTION X-X



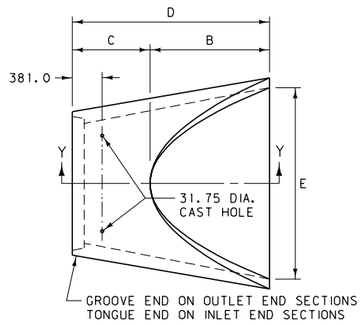
END VIEW

TYPE "B"							
DIA.	SLOPE	X	B	C	D	E	T *
300	2.4:1	101.6	609.6	1219.2	1828.8	609.6	50.8
375	2.4:1	152.4	685.8	1143.0	1828.8	762.0	57.2
450	2.3:1	228.6	685.8	1143.0	1828.8	914.4	63.5
600	2.5:1	241.3	1104.9	723.9	1828.8	1219.2	76.2
750	2.5:1	304.8	1371.6	457.2	1828.8	1524.0	88.9
900	2.5:1	381.0	1600.2	889.0	2489.2	1828.8	101.6
1050	2.5:1	533.4	1600.2	889.0	2489.2	1981.2	114.3
1200	2.5:1	609.6	1828.8	660.4	2489.2	2133.6	127.0
1350	2.0:1	685.8	1651.0	850.9	2501.9	2286.0	139.7

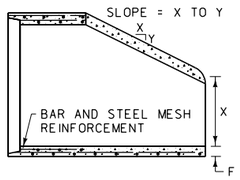
* WALL "B" THICKNESS

TOLERANCES IN THE ADJACENT TABLES MAY NOT VARY MORE THAN ±1.5% FOR THE DIMENSIONS SHOWN. OTHERWISE THEY MUST CONFORM TO AASHTO M 170M.

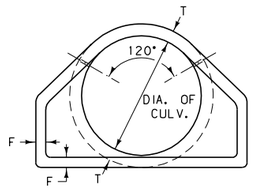
LARGE DIAMETER PIPE



PLAN



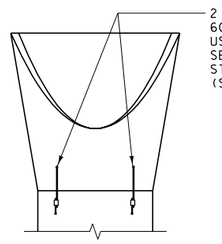
SECTION Y-Y



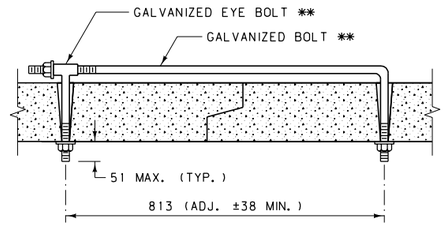
END VIEW

LARGE DIAMETER CULVERT								
DIA.	SLOPE	T *	X	B	C	D	E	F
1500	1.9:1	152.4	889.0	1524.0	990.6	2514.6	2438.4	127.0
1650	1.7:1	165.1	762.0	1828.8	685.8	2514.6	2590.8	139.7
1800	1.9:1	177.8	914.4	1981.2	533.4	2514.6	2743.2	152.4
1950	1.8:1	190.5	914.4	2286.0	533.4	2819.4	2895.6	165.1
2100	1.5:1	203.2	914.4	2298.7	533.4	2832.1	3048.0	165.1
2250	1.5:1	215.9	1041.4	2222.5	609.6	2832.1	3352.8	165.1

* WALL "B" THICKNESS



TIE BOLT CONNECTION



** M20 FOR 300 TO 1350 DIA. RCP
M24 FOR 1500 TO 2100 DIA. RCP

TIE BOLT DETAIL
(TWO PER END SECTION)

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

TIE BOLTS: USE TWO TIE BOLTS ON ALL FLARED END SECTIONS, ONE ON EACH SIDE AT 60° TO THE VERTICAL. GALVANIZE ALL PARTS. SEE TIE BOLT DETAIL.

CONSTRUCTION: CONSTRUCT ACCORDING TO CLASS III, AASHTO M 170M, AS FAR AS DESIGN WILL PERMIT.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 603, 708

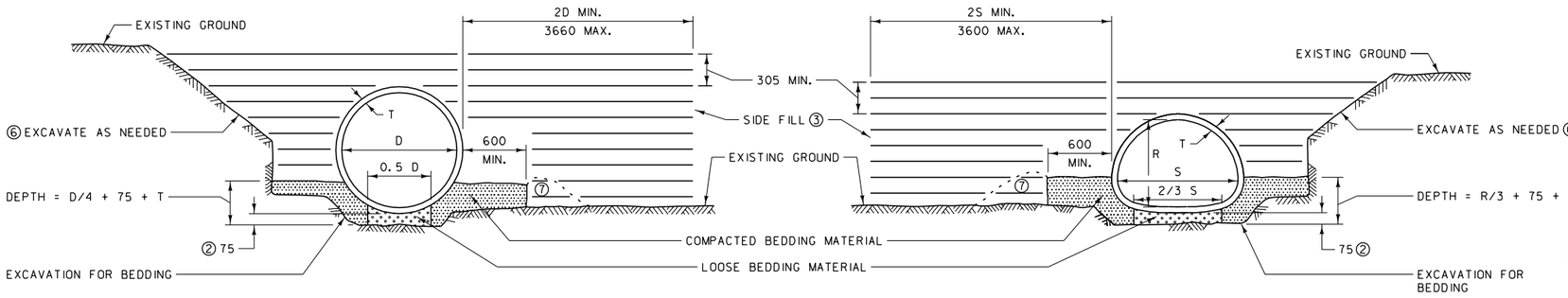
DWG. NO. 603-08

PREFABRICATED RCP FLARED END TERMINAL SECTION (FETS)

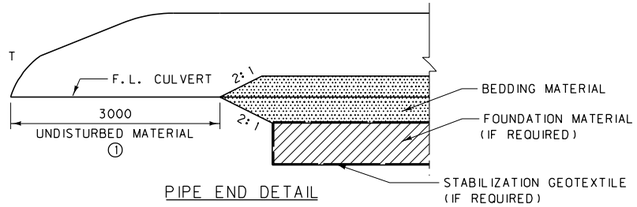
--REVISED--
January 2008

EFFECTIVE: FEBRUARY 2005

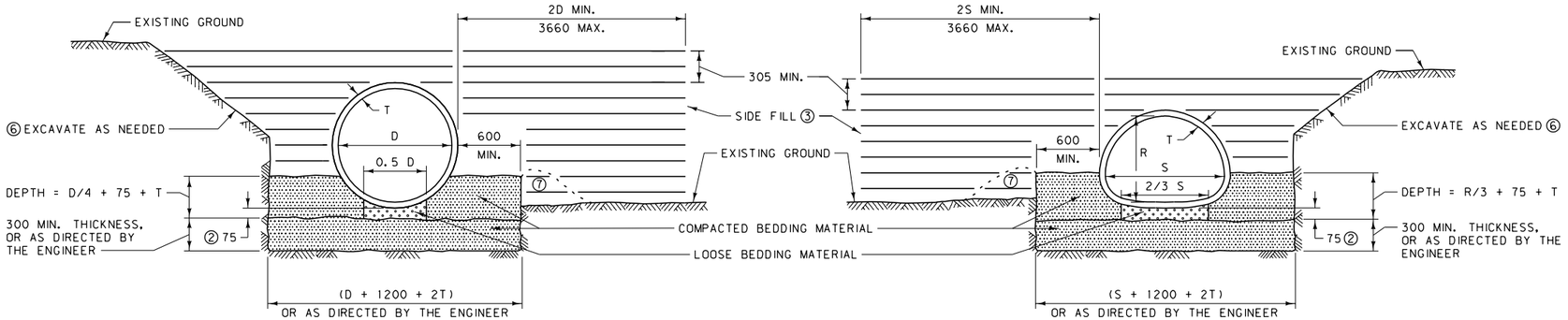
MONTANA DEPARTMENT OF TRANSPORTATION
serving you with pride



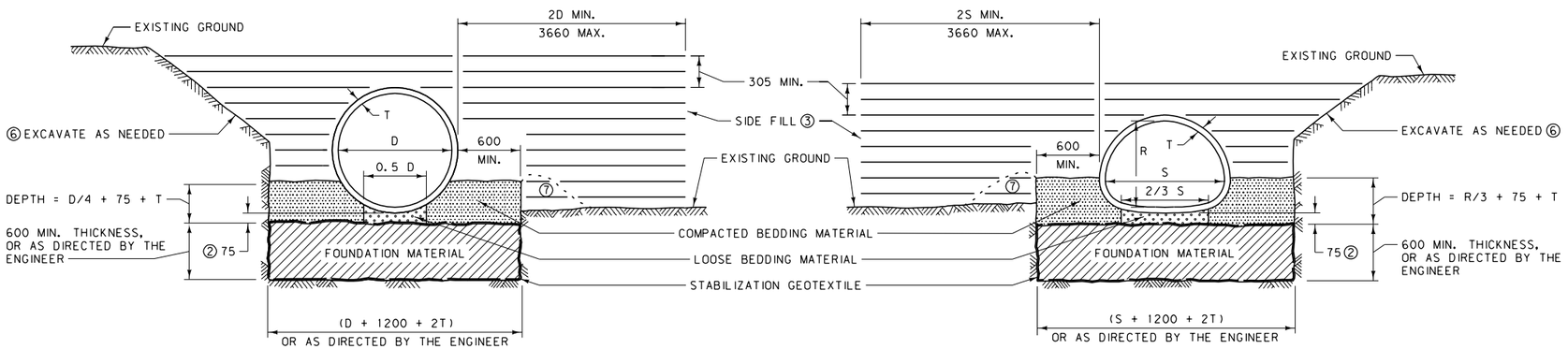
1-STANDARD BEDDING INSTALLATION



PIPE END DETAIL



2-ROCK



3-FOUNDATION STABILIZATION

NOTES:

① DO NOT EXTEND BEDDING MATERIAL TO THE END OF THE PIPE. LEAVE 3000 mm OF UNDISTURBED MATERIAL AT EACH END UNLESS OTHERWISE NOTED IN PLANS. SEE PIPE END DETAIL.

② PLACE LOOSE BEDDING MATERIAL UNIFORMLY IN THE BOTTOM OF THE TRENCH AND SHAPE TO FIT BOTTOM OF PIPE. THE MINIMUM THICKNESS BEFORE PLACING PIPE IS 75 mm. 1050 mm AND 1200 mm RCP IRR. REQUIRE 100 mm DEPTH OF LOOSE BEDDING MATERIAL TO ACCOMODATE BELL THICKNESS. AFTER LAYING CULVERT, COMPACT BEDDING MATERIAL AT HAUNCHES AND SIDES OF PIPE.

③ COMPACT SIDE FILL IN 155 mm LOOSE LAYERS TO DENSITY SPECIFIED FOR ADJACENT EMBANKMENT. SEE SECTION 203.03.3 OF THE STANDARD SPECIFICATIONS FOR THE DENSITY REQUIREMENTS.

④ SEE SECTION 701.04 OF THE STANDARD SPECIFICATIONS FOR BEDDING AND FOUNDATION MATERIAL REQUIREMENTS.

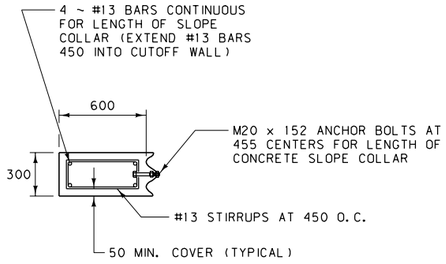
⑤ DIMENSIONS D, S AND R ARE INSIDE PIPE DIAMETER, SPAN AND RISE. DIMENSION T IS THE CULVERT SHELL THICKNESS FOR CONCRETE OR CORRUGATION WIDTH FOR METAL. CORRUGATION WIDTHS ARE TYPICALLY 13 mm FOR 1200 mm EQUIVALENT SIZE METAL CULVERTS AND SMALLER.

⑥ EXCAVATE A SUFFICIENT AMOUNT TO PROVIDE A SAFE WORKING ENVIRONMENT AND TO ALLOW ACHIEVEMENT OF ALL CULVERT INSTALLATION AND COMPACTION REQUIREMENTS. SLOPE, BENCH OR PROVIDE SHORING FOR ALL EXCAVATIONS IN ACCORDANCE WITH THE U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION.

⑦ BUILD BERM WITH FILL MATERIAL AS NEEDED TO CONTAIN THE BEDDING MATERIAL TO THE PROPER DEPTH.

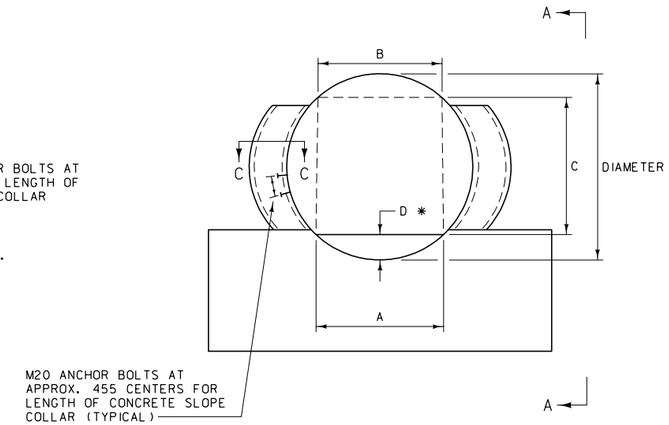
ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING	
REFERENCE STANDARD SPEC. SECTION 207, 603, 701	DWG. NO. 603-18
BEDDING FOR MAINLINE & PUBLIC APPROACH CULVERTS 1200 mm EQUIV. & SMALLER	
--REVISED-- January 2008	EFFECTIVE: APRIL 2006
	MDT serving you with pride — MONTANA DEPARTMENT OF TRANSPORTATION

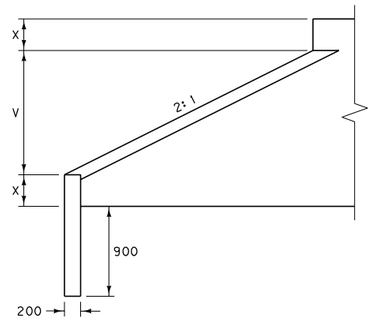


NOTE:
SEE DTL. DWG. NO. 552-00
FOR ANCHOR BOLT DETAILS.

SECTION C-C



ELEVATION



SECTION A-A

NOTES:

DESIGNATE THESE STRUCTURES, IN PLANS AND PROPOSAL, AS "VEHICULAR UNDERPASS." CONFORM MATERIALS, INSTALLATION, AND OTHER PROVISIONS TO THE STANDARD SPECIFICATIONS. USE THE TERM "VEHICULAR UNDERPASS," REGARDLESS OF THE USE OR PURPOSE OF THE STRUCTURE.

PROVIDE END TREATMENT FOR ALL VEHICULAR UNDERPASSES INCLUDING CUTOFF WALLS, BACKFILL RETAINING WALLS AND CONCRETE SLOPE COLLARS.

PROVIDE SURFACING FOR THE INSIDE OF THE STRUCTURE, CROSS-SLOPED TO ALLOW A DRAINAGE COURSE ALONG ONE SIDE.

FOR PLATE THICKNESS SEE ROAD DESIGN MANUAL FILL HEIGHT TABLES.

USE CLASS "DD" CONCRETE OR EQUAL.

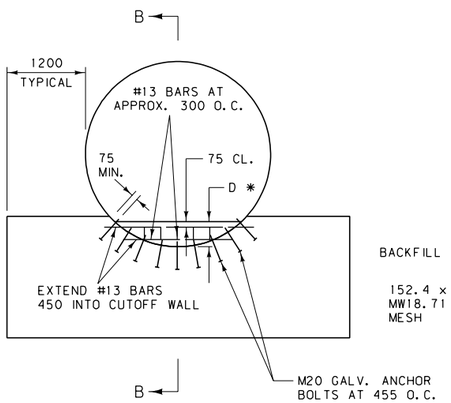
SEE DTL. DWG. NO. 552-08 FOR QUANTITIES.

DEPTH OF SURFACING *		
MATERIAL	ALTERNATE "A"	ALTERNATE "B"
PL. MIX SURF.	—	60
CRUSHED AGGREGATE COURSE	BAL.	BAL.

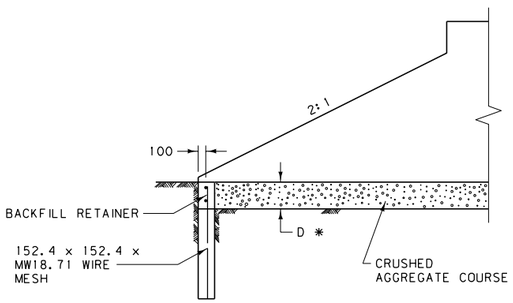
DIAMETER	A (m)	B (m)	C (m)	V (m)	X (m)	* D	BACKFILL RETAINER (m³)	CONCRETE COLLAR (m³)
2400	1.2	1.2	2.078	1.200	0.600	173	0.03	0.50
3000	2.1	2.1	2.142	1.500	0.750	441	0.13	0.63
3.825 m	3.0	2.4	2.683	1.916	0.957	750	0.32	0.80
4.135 m	3.0	2.4	3.114	2.071	1.035	669	0.28	0.87
4.755 m	3.6	3.0	3.407	2.381	1.190	848	0.43	1.00
4.910 m	3.6	3.0	3.622	2.459	1.229	809	0.41	1.03
5.220 m	3.6	3.0	4.035	2.613	1.307	744	0.38	1.10
5.530 m	3.6	3.0	4.431	2.770	1.384	690	0.35	1.16
5.840 m	4.8	3.6	3.975	2.924	1.462	1279	0.87	1.23
6.150 m	4.8	3.6	4.428	3.079	1.540	1176	0.80	1.29

SURFACING QUANTITIES PER METER FOR DEPTH "D" *						
	ALTERNATE "A"	ALTERNATE "B"				
	m³ SURFACING	TONS SURFACING		m³ SURFACING	TONS BIT. MATL.		
DIAMETER	CRUSHED AGGREGATE COURSE	COVER MATERIAL	PLANT MIX	CRUSHED AGGREGATE COURSE	PLANT MIX	PRIME	SEAL
2400	0.147	0.0175	0.158	0.078	0.0095	0.0015	0.0020
3000	0.649	0.0299	0.284	0.525	0.0170	0.0029	0.0034
3.825 m	1.604	0.0429	0.414	1.423	0.0248	0.0042	0.0049
4.135 m	1.420	0.0430	0.414	1.239	0.0248	0.0042	0.0049
4.755 m	2.159	0.0513	0.496	1.942	0.0298	0.0051	0.0059
4.910 m	2.056	0.0514	0.496	1.839	0.0298	0.0051	0.0059
5.220 m	1.882	0.0514	0.496	1.665	0.0298	0.0051	0.0059
5.530 m	1.741	0.0515	0.496	1.524	0.0298	0.0050	0.0059
5.840 m	4.368	0.0681	0.661	4.079	0.0397	0.0068	0.0078
6.150 m	3.985	0.0681	0.661	3.696	0.0397	0.0068	0.0078

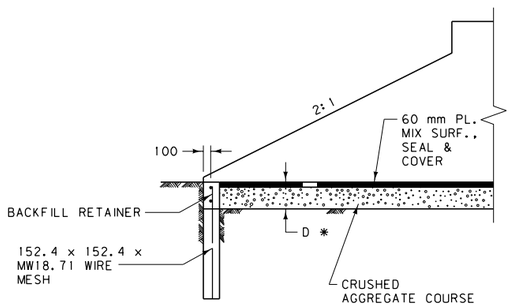
BACKFILL RETAINER & CUTOFF WALL DETAIL



ELEVATION



SECTION B-B
(ALTERNATE "A")



SECTION B-B
(ALTERNATE "B")

NOTE:
INCLUDE CONCRETE COLLAR
WHEN SPECIFIED.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 552.603

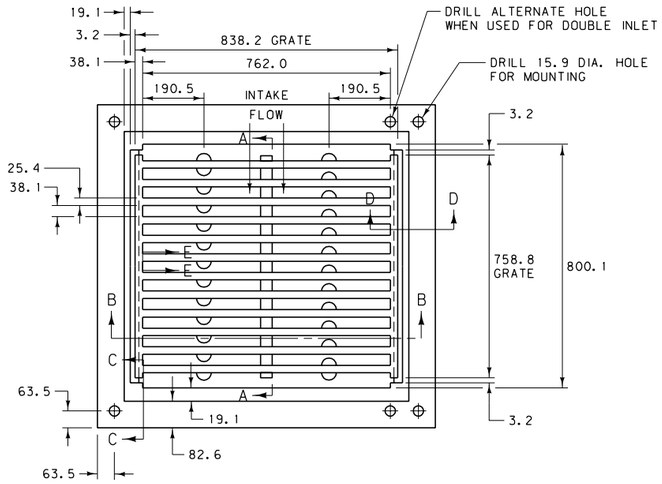
DWG. NO. 603-30

VEHICULAR UNDERPASS AND BACKFILL RETAINER & CUTOFF WALL DETAIL

--REVISED--
January 2008

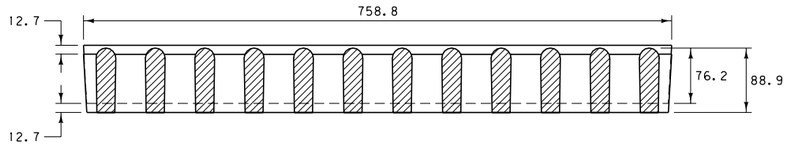
EFFECTIVE: FEBRUARY 2005

MDT serving you with pride — MONTANA DEPARTMENT OF TRANSPORTATION

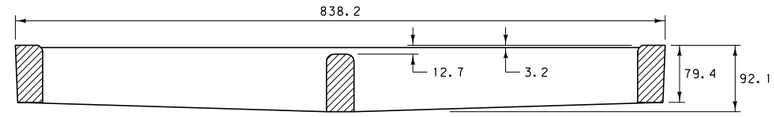


PLAN

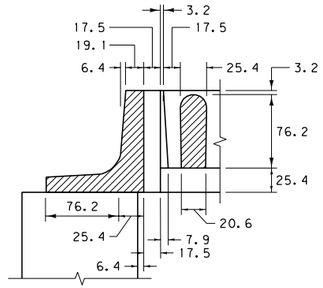
NOTE: INSTALL GRATE WITH BARS PERPENDICULAR TO INTAKE FLOW



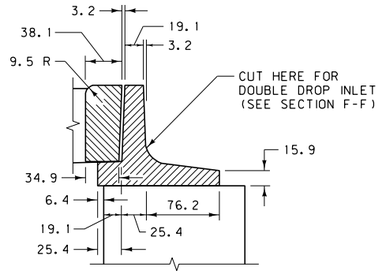
SECTION A-A
GRATE



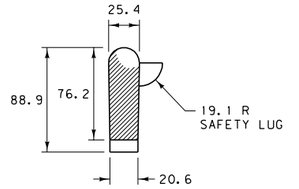
SECTION B-B
GRATE



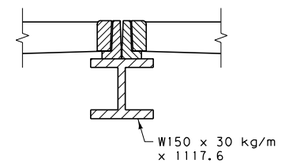
SECTION C-C



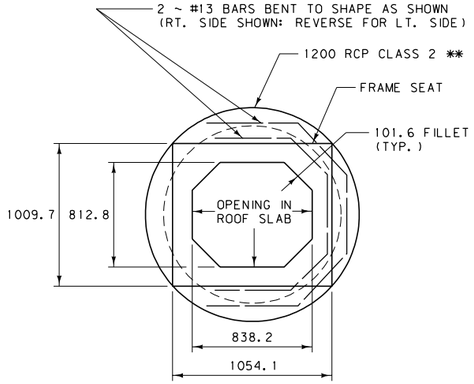
SECTION D-D

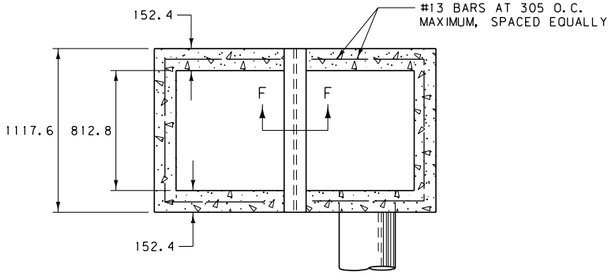


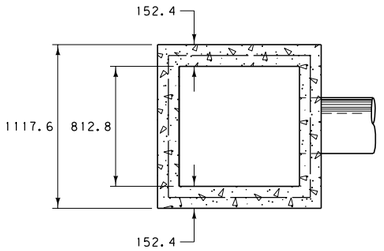
SECTION E-E



SECTION F-F
(FOR DOUBLE INLET)

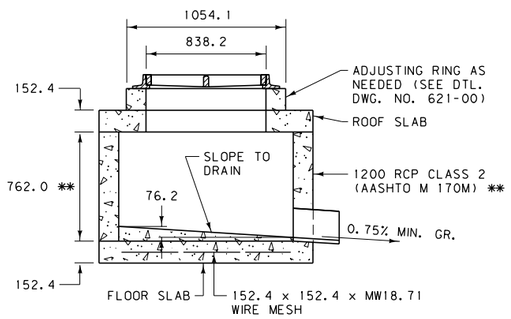




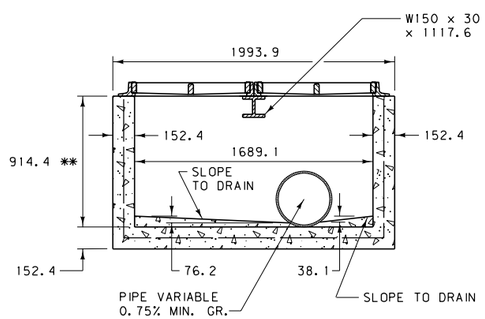


QUANTITIES *		
	CONCRETE	REINF. STL.
TYPE I	0.344 m³	18.1 kg
TYPE II	1.147 m³	65.8 kg
TYPE III	0.765 m³	40.8 kg

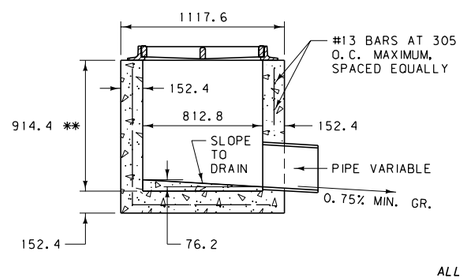
* FOR ESTIMATING PURPOSES ONLY



ROUND, SINGLE DROP INLET
TYPE I



DOUBLE DROP INLET
TYPE II



SINGLE DROP INLET
TYPE III

NOTES:

USE TYPE I, TYPE II AND TYPE III DROP INLETS IN SAG LOCATIONS ONLY.

ALL CONCRETE IS CLASS "DD" OR APPROVED EQUAL.

SEE PLANS FOR DETAILS AND QUANTITIES.

** STANDARD UNLESS OTHERWISE NOTED ON PLANS.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 604

DWG. NO. 604-14

DROP INLETS

--REVISED--
January 2008

EFFECTIVE: FEBRUARY 2005

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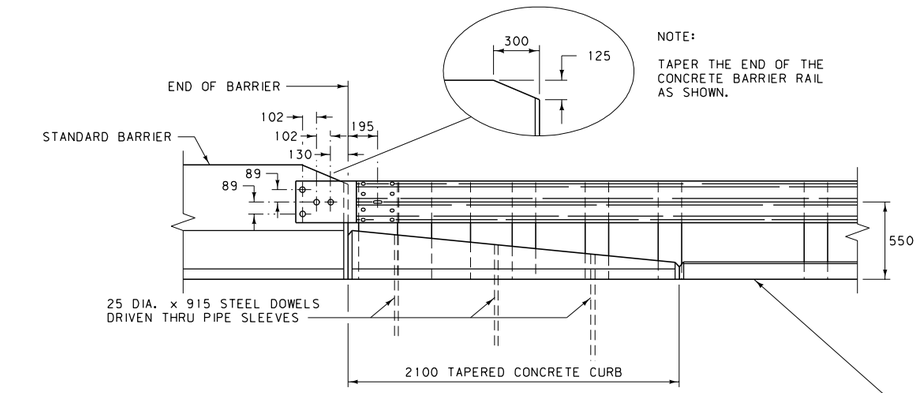
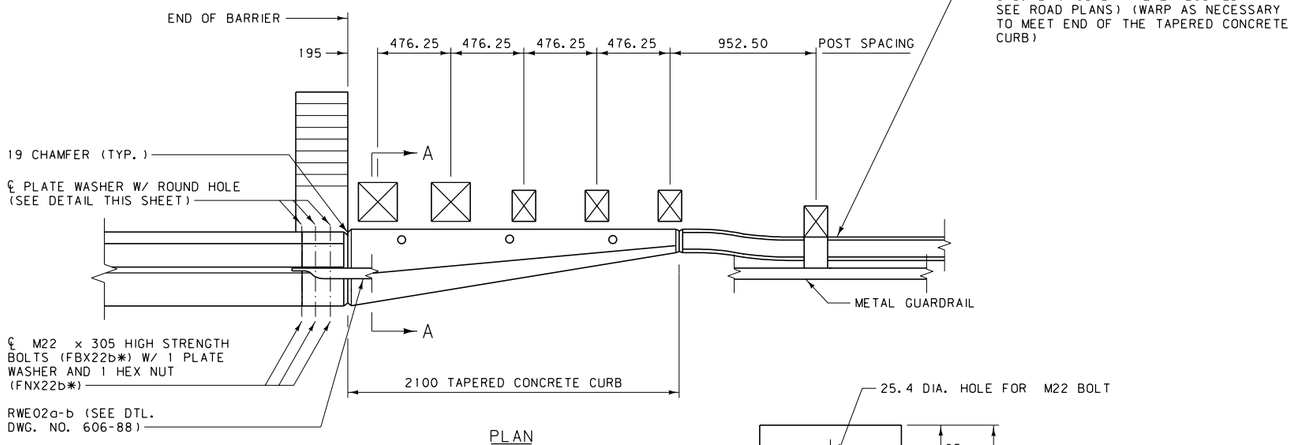
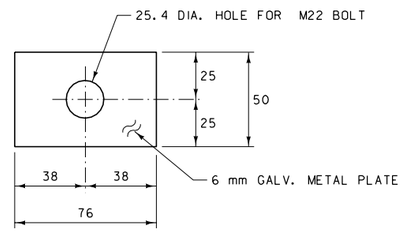


ELEVATION

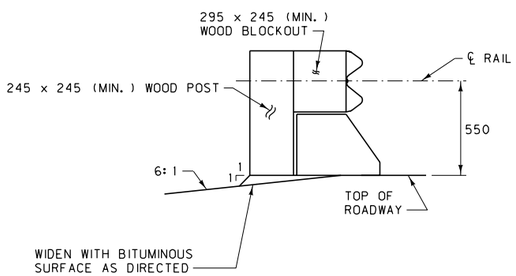


PLAN



DETAIL "A"

PLATE WASHER



SECTION A-A

NOTES:

① TAPERED CONCRETE CURBS:
TYPE 1, SEE DTL. DWG. NO. 606-26
TYPE 3, SEE DTL. DWG. NO. 606-27

② TAPERED CONCRETE CURBS ARE ALSO REQUIRED ON CONCRETE APPROACH SLABS.

③ PORTIONS OF GUARDRAIL & BLOCKOUTS ARE OMITTED FOR CLARITY.

④ LAP GUARDRAIL IN THE DIRECTON OF THE ADJACENT TRAFFIC LANE. (SEE DTL. DWG. NO. 606-05A).

⑤ LAP W-BEAM TERMINAL CONNECTOR (RWE02a-b) IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE.

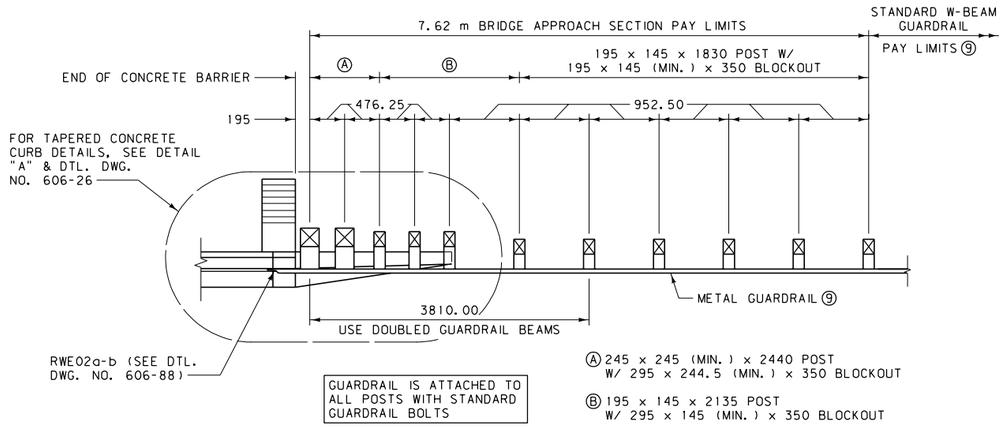
⑥ USE WOOD BLOCKS OR OTHER NCHRP 350 APPROVED BLOCKS FOR BLOCKOUTS.

⑦ DO NOT FLARE BRIDGE APPROACH SECTIONS.

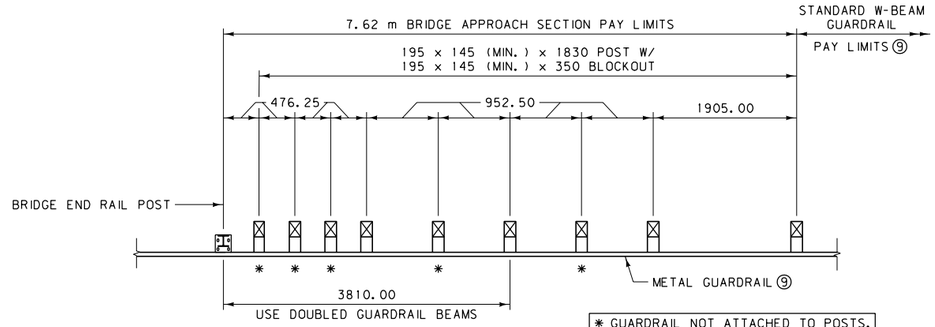
⑧ SEE DTL. DWG. NO. 606-25A FOR SKEWED BRIDGES.

⑨ SEE DTL. DWG. NO. 606-05A FOR METAL GUARDRAIL (W-BEAM).

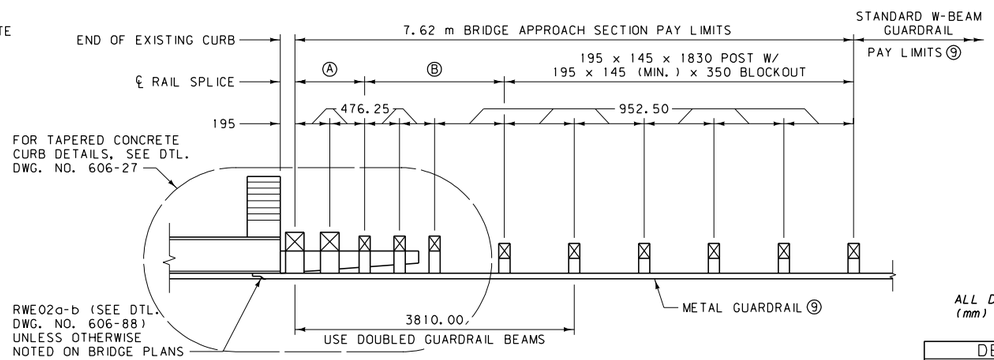
* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 1
(FOR BRIDGES USING CONCRETE BARRIER RAIL)



METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 2
(FOR BRIDGES WITHOUT CURBS)



METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 3
(FOR BRIDGES WITH EXISTING CONCRETE CURBS)

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-24A

BRIDGE APPROACH SECTIONS - WOOD POSTS

--REVISED--
January 2008

EFFECTIVE: FEBRUARY 2005

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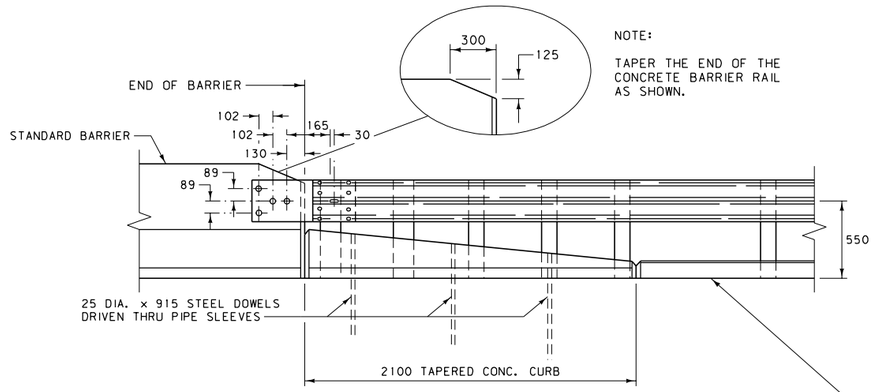
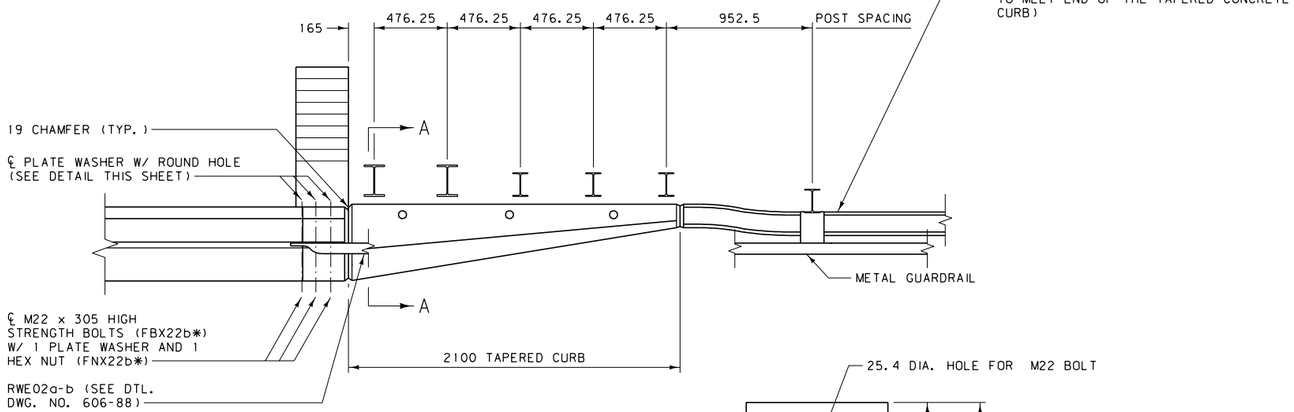
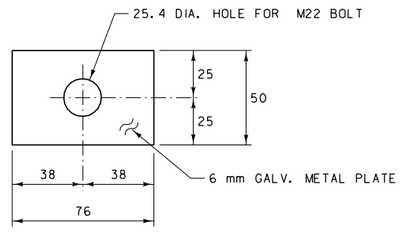


ELEVATION

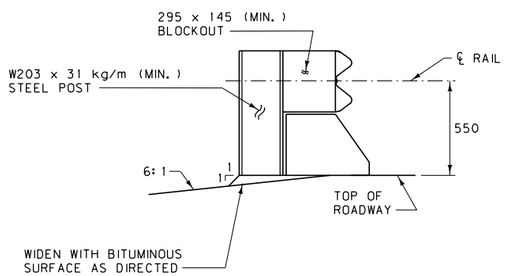


PLAN



DETAIL "A"

PLATE WASHER



SECTION A-A

NOTES:

① TAPERED CONCRETE CURBS:
TYPE 1, SEE DTL. DWG. NO. 606-26
TYPE 3, SEE DTL. DWG. NO. 606-27

② TAPERED CONCRETE CURBS ARE ALSO REQUIRED ON CONCRETE APPROACH SLABS.

③ PORTIONS OF GUARDRAIL & BLOCKOUTS ARE OMITTED FOR CLARITY.

④ LAP GUARDRAIL IN THE DIRECTON OF THE ADJACENT TRAFFIC LANE. (SEE DTL. DWG. NO. 606-05B).

⑤ LAP W-BEAM TERMINAL CONNECTOR (RWE02a-b) IN THE DIRECTION OF THE ADJACENT TRAFFIC LANE.

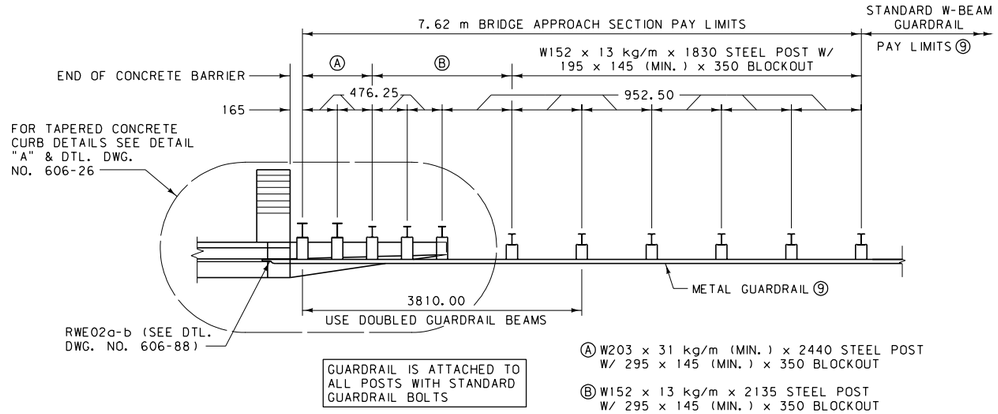
⑥ USE ROUTED WOOD BLOCKS OR OTHER NCHRP 350 APPROVED BLOCKS FOR BLOCKOUTS.

⑦ DO NOT FLARE BRIDGE APPROACH SECTIONS.

⑧ SEE DTL. DWG. NO. 606-25B FOR SKEWED BRIDGES.

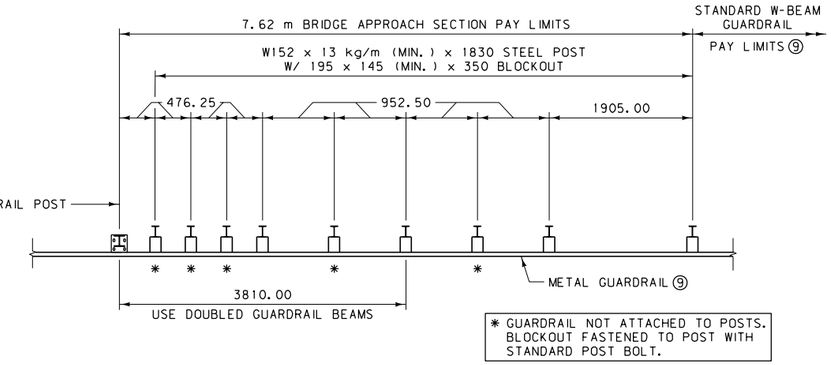
⑨ SEE DTL. DWG. NO. 606-05B FOR METAL GUARDRAIL (W-BEAM).

* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



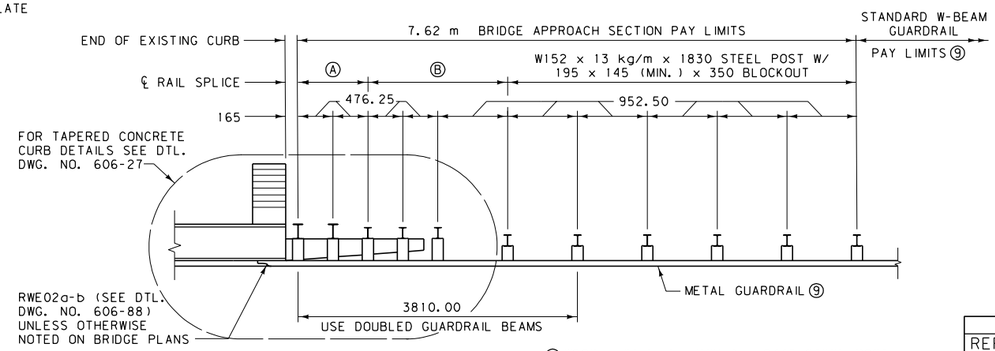
METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 1

(FOR BRIDGES USING CONCRETE BARRIER RAIL)



METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 2

(FOR BRIDGES WITHOUT CURBS)



METAL GUARDRAIL-BRIDGE APPROACH SECTION TYPE 3

(FOR BRIDGES WITH EXISTING CONCRETE CURBS)

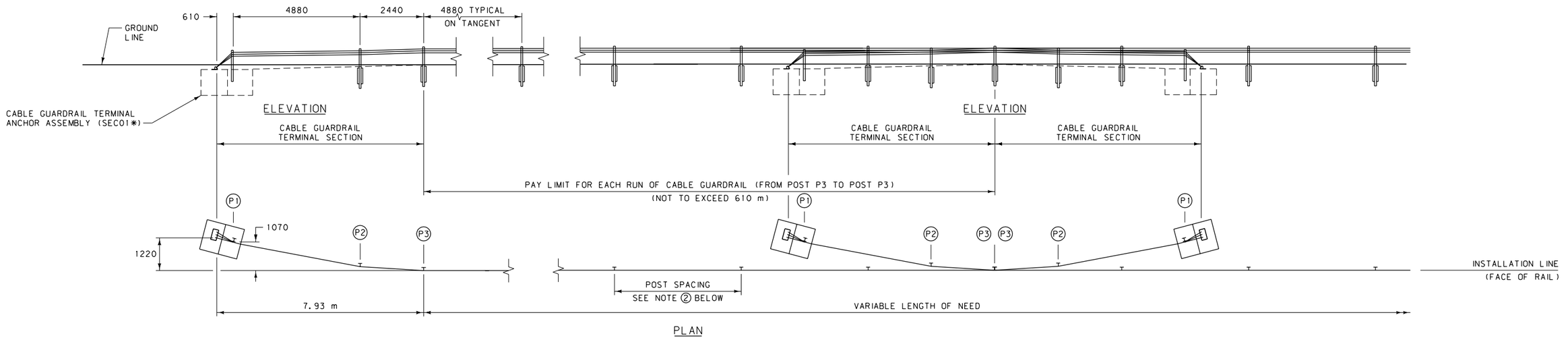
ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

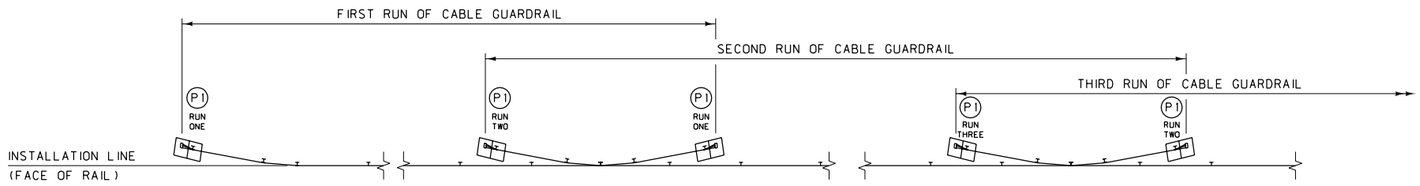
REFERENCE STANDARD SPEC. SECTION 606	DWG. NO. 606-24B

BRIDGE APPROACH SECTIONS - STEEL POSTS

--REVISED--	EFFECTIVE: FEBRUARY 2005
January 2008	MDT serving you with pride — MONTANA DEPARTMENT OF TRANSPORTATION

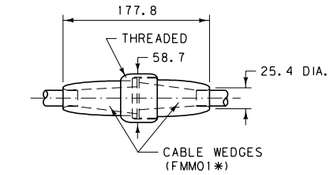


PLAN



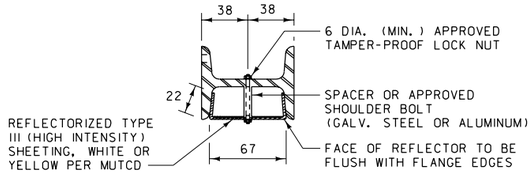
TYPICAL LAYOUT FOR MULTIPLE RUNS OF CABLE GUARDRAIL

EACH RUN OF CABLE GUARDRAIL CONTAINS TWO TERMINAL SECTIONS WITH ANCHOR ASSEMBLIES.

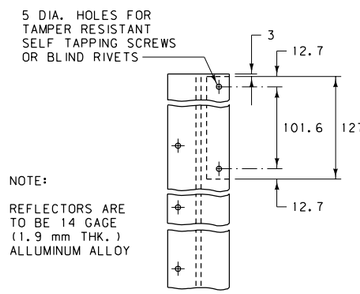


CABLE SPLICE

SPLICE CABLE USING A COUPLING DEVICE AS SHOWN, OR AN ALTERNATE METHOD APPROVED BY THE ENGINEEER.



REFLECTOR ALT. "B"



REFLECTOR ALT. "A"

NOTES:

① FOR CABLE GUARDRAIL RUNS OF:

318.42 m OR LESS: USE COMPENSATING CABLE END ASSEMBLY (RCE01*) ON ONE END AND TURNBUCKLE CABLE END ASSEMBLY * ON THE OTHER END OF EACH CABLE.

GREATER THAN 318.42 m, UP TO 625.86 m MAXIMUM: USE COMPENSATING CABLE END ASSEMBLY (RCE01*) ON BOTH ENDS OF EACH CABLE.

② LINE POST SPACING:

TANGENTS AND CURVES WITH RADII 220 m AND GREATER: 4880 mm.

CURVES WITH RADII LESS THAN 220 m DOWN TO 135 m: 3660 mm.

NOTE: DO NOT INSTALL CABLE GUARDRAIL ON THE INSIDE SHOULDER OF ANY CURVE.

③ UNIFORMLY TENSION ALL CABLES TO COMPRESS SPRINGS BY 90 mm.

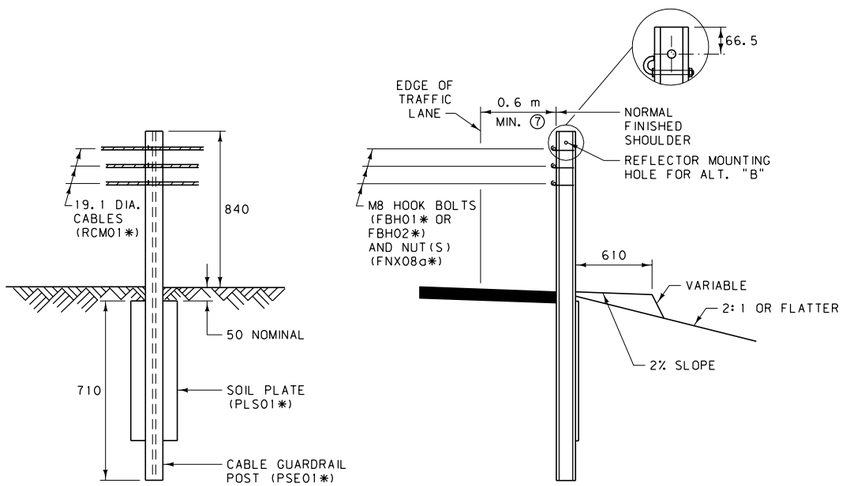
④ DO NOT INSTALL CABLE GUARDRAIL FOR OBSTACLES WITHIN 3.7 m OF THE INSTALLATION LINE.

⑤ DO NOT USE CABLE GUARDRAIL WITH FILL SLOPES STEEPER THAN 2:1, UNLESS THE DISTANCE BETWEEN THE BACK OF THE POSTS AND THE BREAK IN THE FILL SLOPE IS AT LEAST 2.5 m.

⑥ ATTACH REFLECTORS TO EVERY OTHER LINE POST (9.76 m TYP.), BEGINNING AT POST P3. DO NOT ATTACH REFLECTORS TO POSTS P1 AND P2.

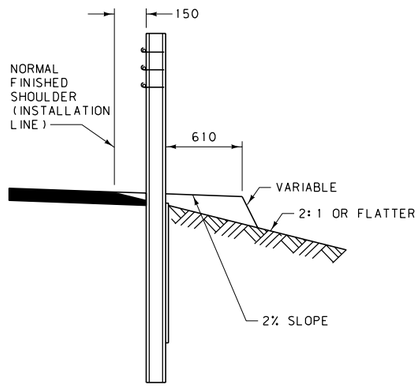
⑦ WIDENING IS REQUIRED IF FINISHED SHOULDER IS LESS THAN 0.6 m FROM THE TRAFFIC LANE.

* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.



TYPICAL INSTALLATION DETAIL

LINE POST & POST P3



TYPICAL INSTALLATION DETAIL

POST P2

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-40

CABLE GUARDRAIL

--REVISED-- January 2008

EFFECTIVE: FEBRUARY 2005

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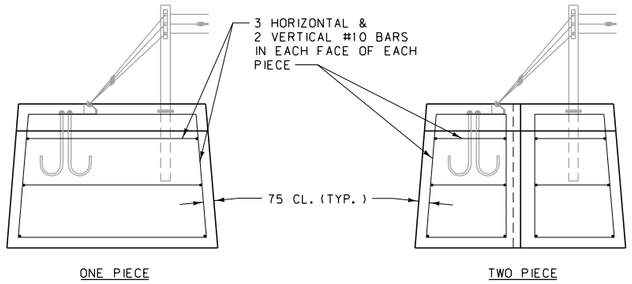
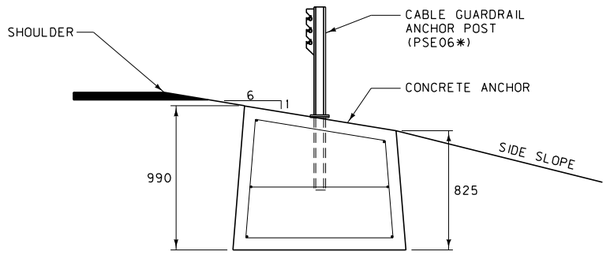
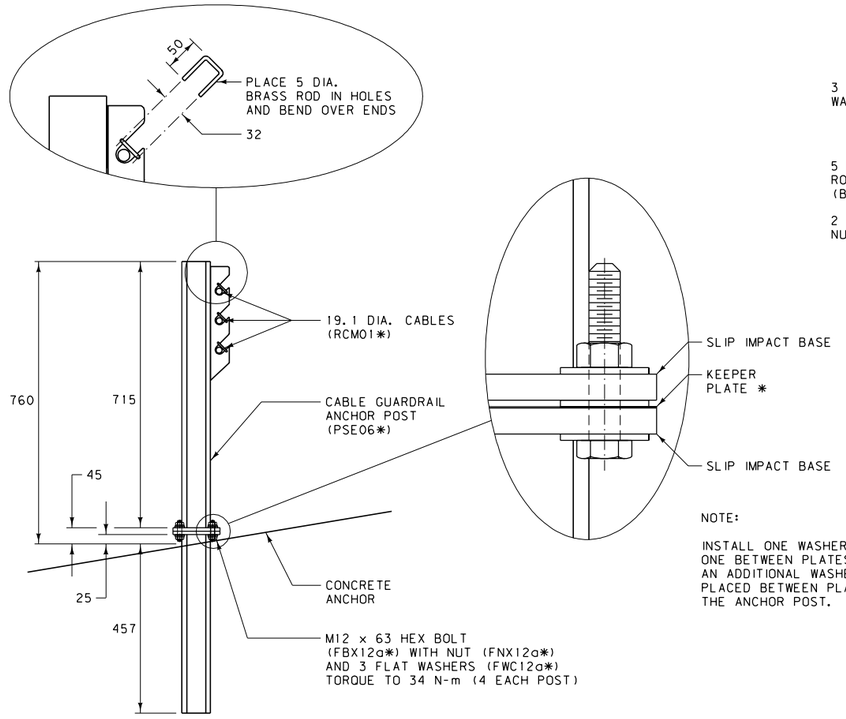




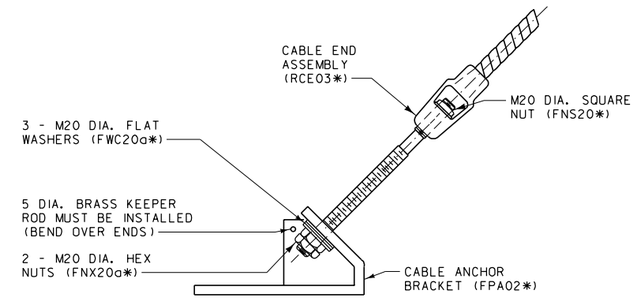
ANCHOR UNIT & RE-BAR INSTALLATION DETAILS



ANCHOR POST DETAIL

NOTE:

INSTALL ONE WASHER UNDER HEAD, ONE BETWEEN PLATES & ONE UNDER NUT. AN ADDITIONAL WASHER MAY BE PLACED BETWEEN PLATES TO PLUMB THE ANCHOR POST.



CABLE END ASSEMBLY TO ANCHOR BRACKET DETAIL

NOTES:

① INSTALL THE CONCRETE ANCHOR INTO THE EXCAVATION, AS DETAILED, SO THAT THE BOTTOM OF THE ANCHOR HAS A FULL AND EVEN BEARING ON THE SURFACE UNDER IT. BACKFILL AROUND THE CONCRETE ANCHOR IN ACCORDANCE WITH SECTION 203.03.3 OF THE STANDARD SPECIFICATIONS.

② THE CONCRETE ANCHOR CAN BE PLACED AS ONE OR TWO PIECES. THIS DETAIL PRIMARILY SHOWS A TWO PIECE INSTALLATION. FOR ONE PIECE INSTALLATIONS, USE ALL THE SAME DIMENSIONS, LESS THE TAPERED KEYWAY AND THE ADDITIONAL REBAR, AS SHOWN.

③ IF LIFTING DEVICES ARE EMBEDDED INTO THE CONCRETE ANCHORS, INSURE THAT THEY HAVE A SAFE WORKING LOAD OF 3.6 METRIC TONS FOR THE ONE PIECE ANCHOR AND 1.8 METRIC TONS EACH FOR EACH OF THE HALVES OF THE TWO PIECE ANCHOR UNIT.

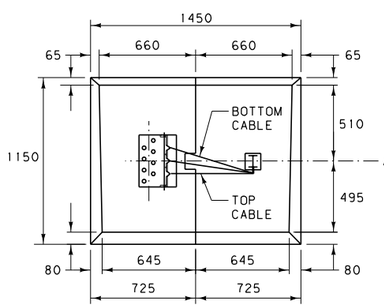
④ USE CLASS "DD" CONCRETE TO CONSRUCT ANCHOR.

* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

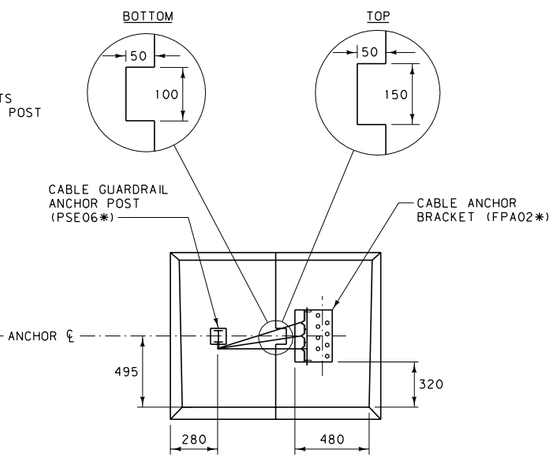
TAPERED KEYWAY DETAIL
(TWO PIECE INSTALLATION)

NOTE:

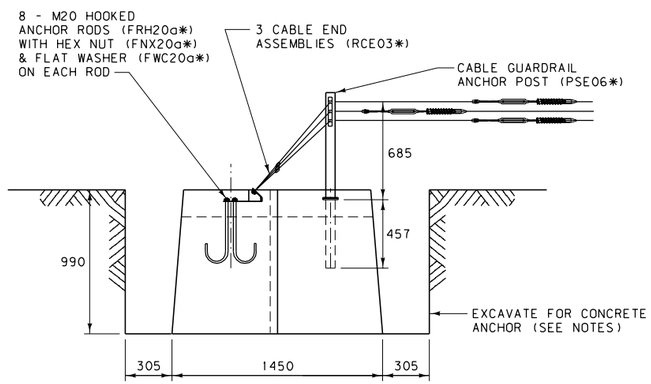
DIMENSIONS FOR LEFT AND RIGHT HAND ANCHOR UNITS ARE THE SAME, WITH THE POSITION OF THE ANCHOR POST AND ANCHOR BRACKET BEING THE ONLY DIFFERENCE.



PLAN
(LEFT HAND ANCHOR UNIT)



PLAN
(RIGHT HAND ANCHOR UNIT)



ELEVATION
(LEFT HAND ANCHOR UNIT)

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-41

CABLE GUARDRAIL TERMINAL ANCHOR ASSEMBLY

--REVISED-- January 2008

EFFECTIVE: FEBRUARY 2005

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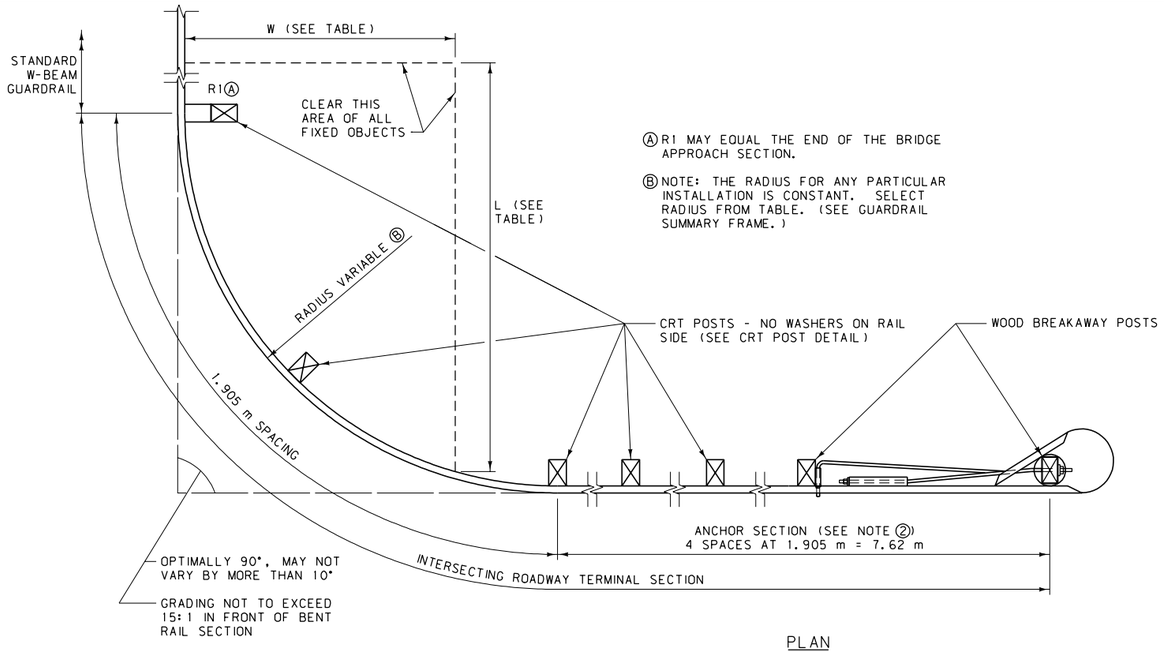
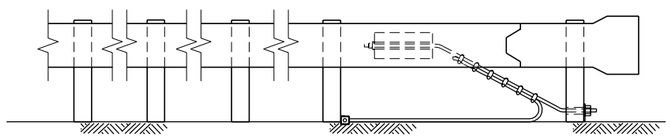


Ⓐ R1 MAY EQUAL THE END OF THE BRIDGE APPROACH SECTION.

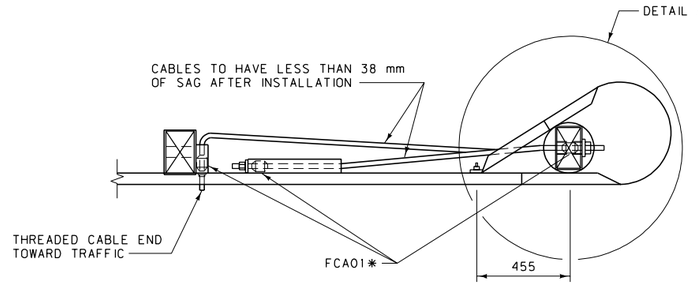
Ⓑ NOTE: THE RADIUS FOR ANY PARTICULAR INSTALLATION IS CONSTANT. SELECT RADIUS FROM TABLE. (SEE GUARDRAIL SUMMARY FRAME.)

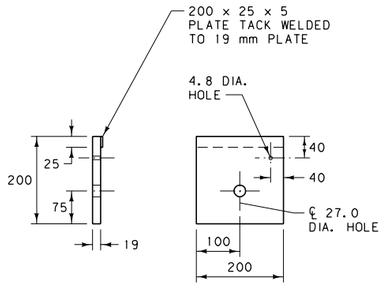
PLAN

RADIUS TABLE			
RADIUS	LENGTH OF BENT RAIL	L	W
2450	3.81 m	7.6 m	4.6 m
4850	7.62 m	9.1 m	4.6 m
7300	11.43 m	12.2 m	6.1 m
9700	15.24 m	15.2 m	6.1 m



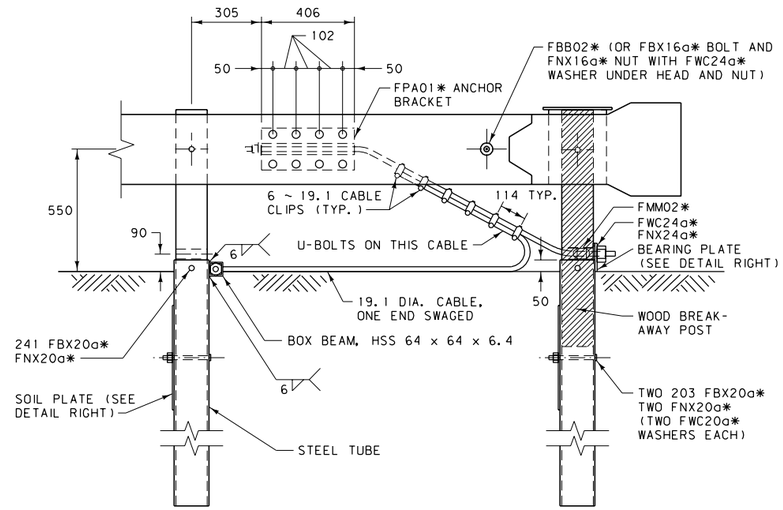
ELEVATION

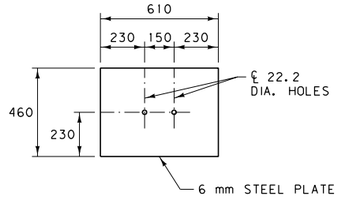




BEARING PLATE DETAIL

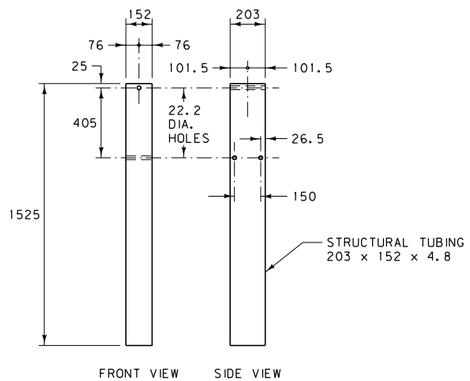
FPB01∗





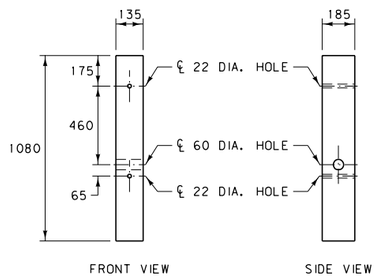
SOIL PLATE DETAIL

PLS03∗



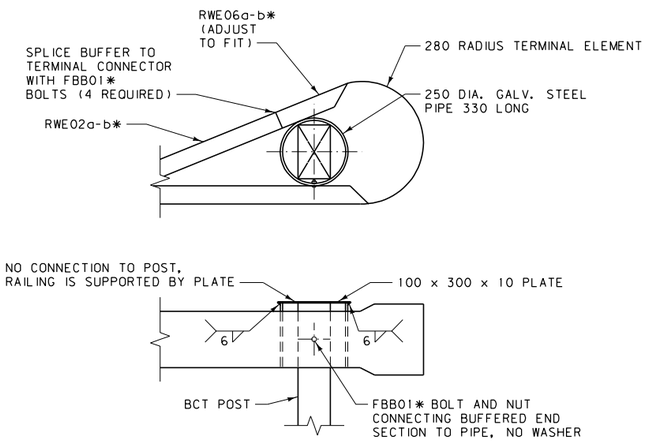
STEEL TUBE DETAILS

PTE05∗

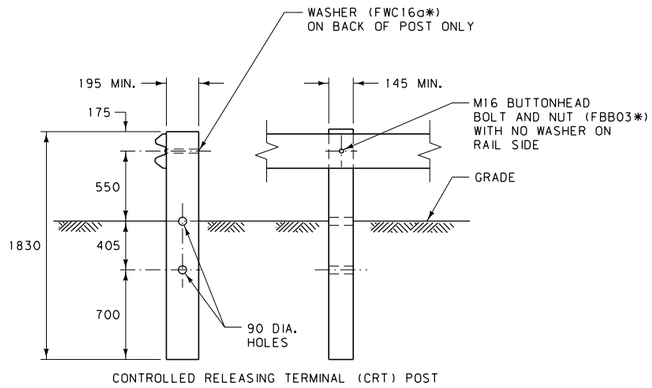


WOOD BREAKAWAY POST DETAILS

PDF01∗



DETAIL A



CRT POST DETAIL

PDE09∗

NOTES:

① DO NOT INSTALL ON SLOPES STEEPER THAN 2:1.

② DO NOT OMIT OR SHORTEN ANCHOR SECTION.

③ SEE DTL. DWG. NO. 606-05A FOR GUARDRAIL WIDENING REQUIREMENTS.

∗ SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-46

INTERSECTING ROADWAY TERMINAL SECTION

--REVISED-- January 2008

EFFECTIVE: FEBRUARY 2005

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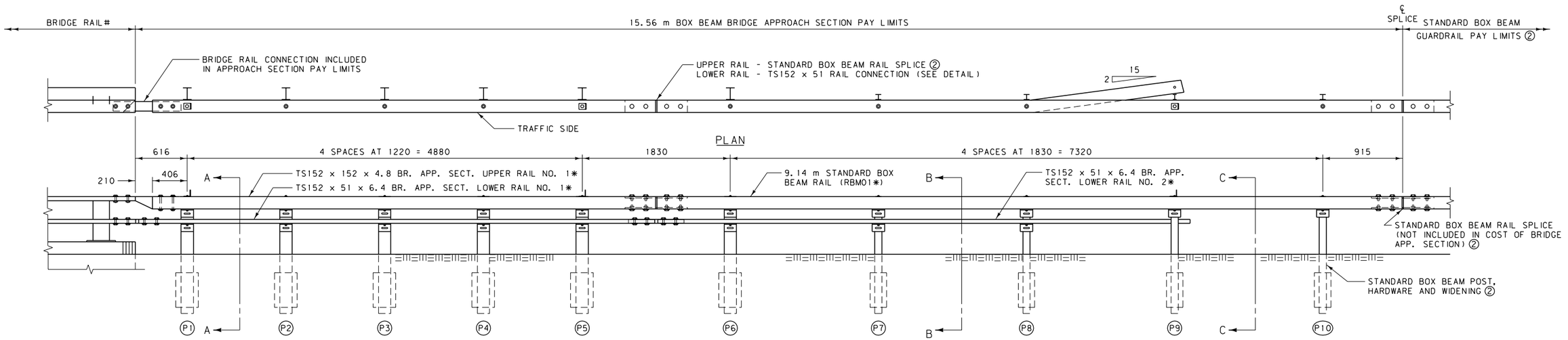
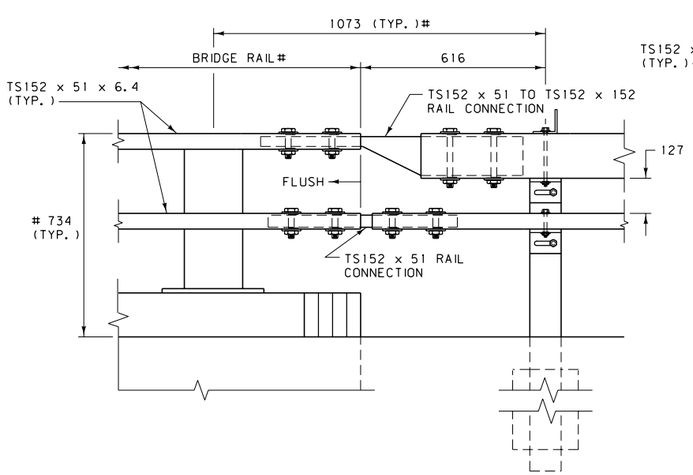
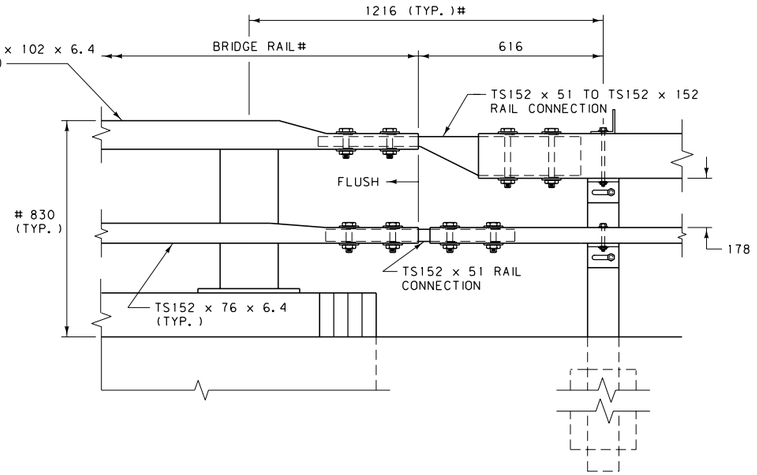
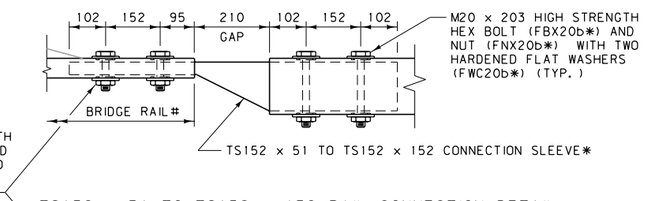




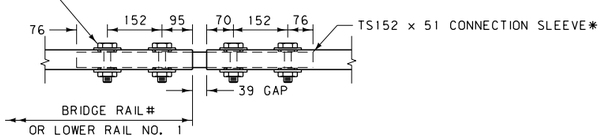
BOX BEAM - BRIDGE APPROACH SECTION TYPE 1



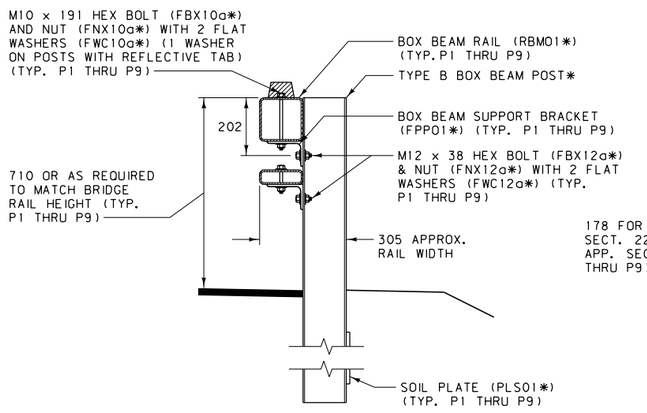
BOX BEAM - BRIDGE APPROACH SECTION TYPE 2



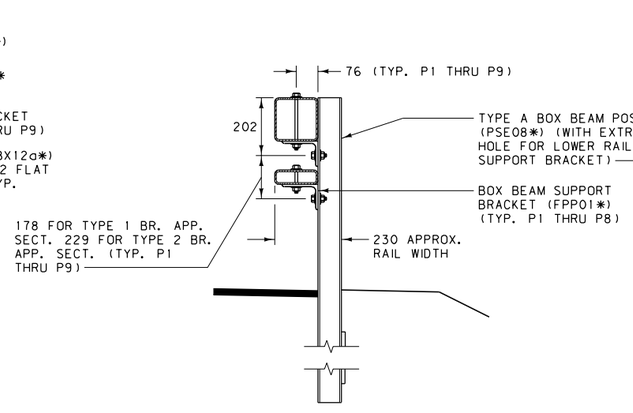
TS152 x 51 TO TS152 x 152 RAIL CONNECTION DETAIL



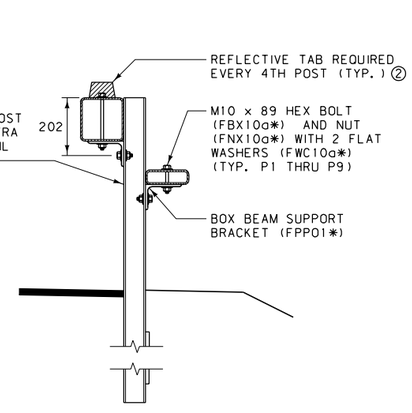
TS152 x 51 RAIL CONNECTION DETAIL



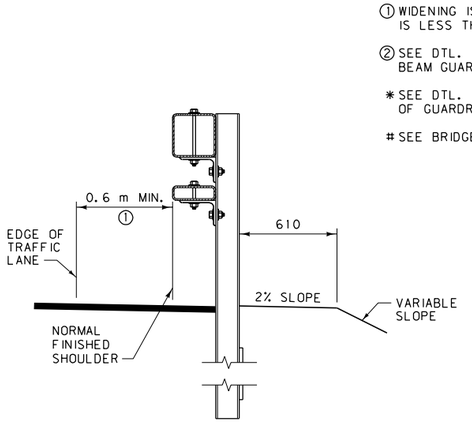
SECTION A-A
(TYP. AT POSTS P1 THRU P6)



SECTION B-B
(TYP. AT POSTS P7 & P8)



SECTION C-C
(POST P9)



GUARDRAIL WIDENING DETAIL
(TYP AT POST P1 THRU P9)

NOTES:

① WIDENING IS REQUIRED IF FINISHED SHOULDER IS LESS THAN 0.6 m FROM THE TRAFFIC LANE.

② SEE DTL. DWG. NO. 606-50 FOR STANDARD BOX BEAM GUARDRAIL AND ASSOCIATED DETAILS.

* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

SEE BRIDGE PLANS.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-53

BOX BEAM BRIDGE APPROACH SECTION - TYPES 1 & 2

--REVISED--
January 2008

EFFECTIVE: FEBRUARY 2005

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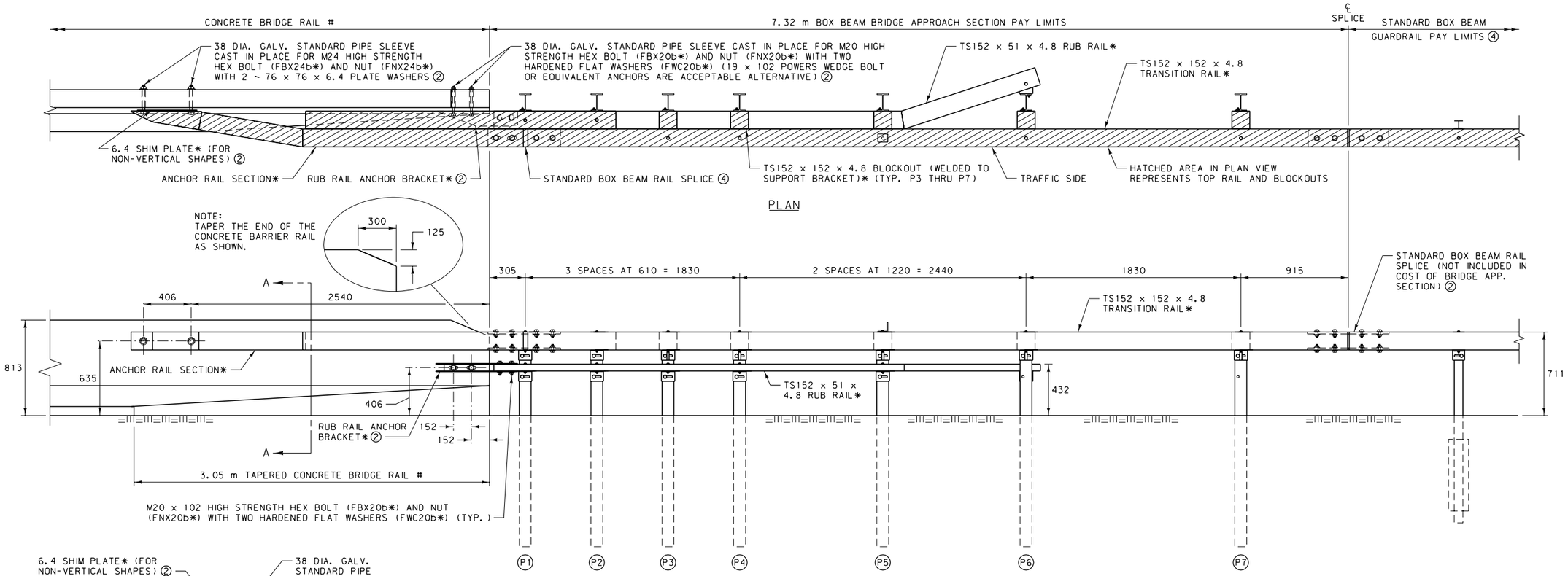
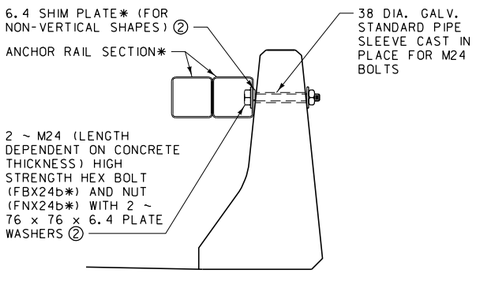
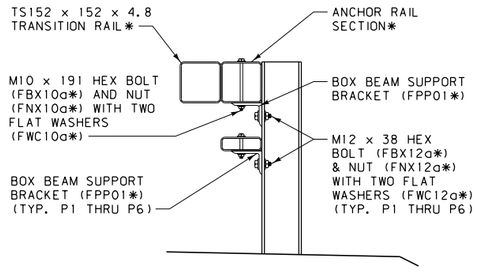
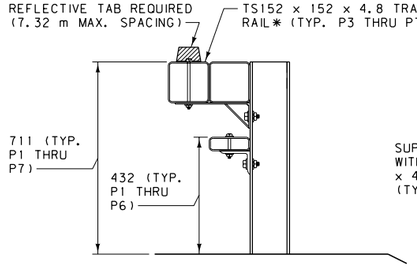




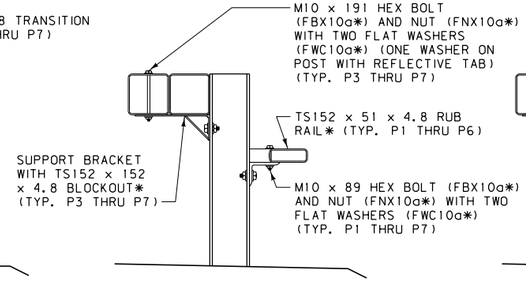
SECTION A-A



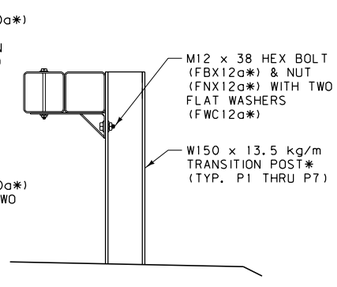
TYP. AT POSTS P1 & P2



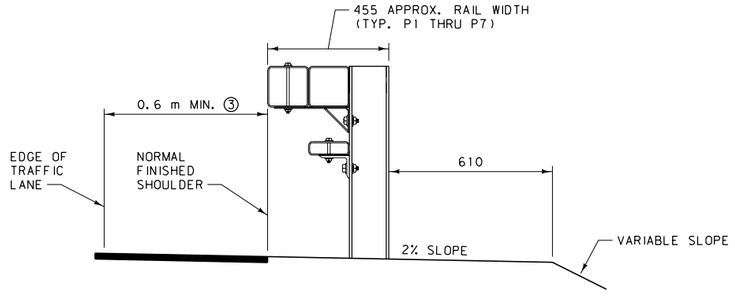
TYP. AT POSTS P3 THRU P5



POST P6



POST P7



GUARDRAIL WIDENING DETAIL

NOTES:

① INCLUDE COST OF ENTIRE ANCHOR RAIL SECTION, ALONG WITH ALL HARDWARE NECESSARY FOR ATTACHMENT TO CONCRETE BRIDGE RAIL, IN COST OF BRIDGE APPROACH SECTION.

② THE LENGTHS OF CONCRETE ANCHOR BOLTS, TYPE OF RUB RAIL ANCHOR BRACKET AND THE NEED FOR THE 6.4 mm SHIM PLATE IS DEPENDENT UPON THE SHAPE AND THE THICKNESS OF THE CONCRETE BRIDGE RAIL.

③ WIDENING IS REQUIRED IF FINISHED SHOULDER IS LESS THAN 0.6 m FROM THE TRAFFIC LANE.

④ SEE DTL. DWG. NO. 606-50 FOR STANDARD BOX BEAM GUARDRAIL AND ASSOCIATED DETAILS.

* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

SEE BRIDGE PLANS.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-53A

BOX BEAM BRIDGE APPROACH SECTION - TYPE 3

--REVISED--

EFFECTIVE: JANUARY 2008

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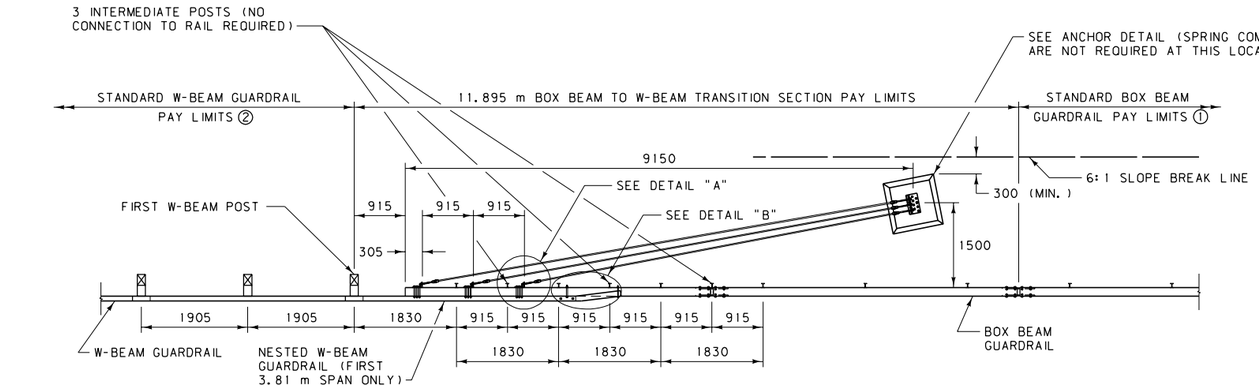
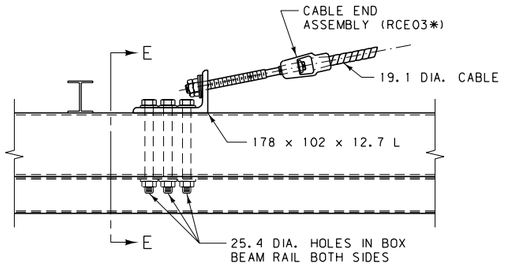


BOX BEAM TO W-BEAM TRANSITION SECTION ③

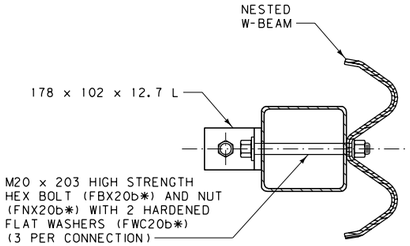
TWO-WAY TRAFFIC

OR ONE-WAY TRAFFIC

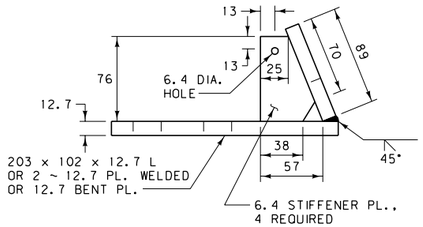
OR ONE-WAY TRAFFIC



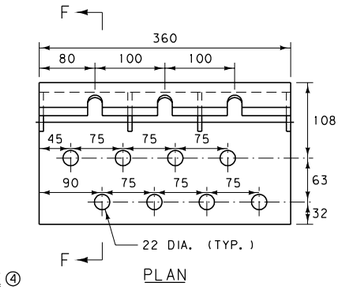
DETAIL A
PLAN



SECTION E-E

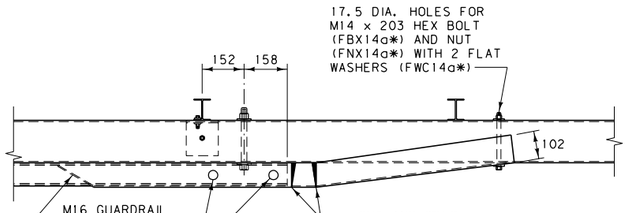


SECTION F-F

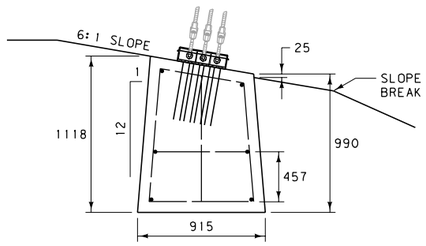


PLAN

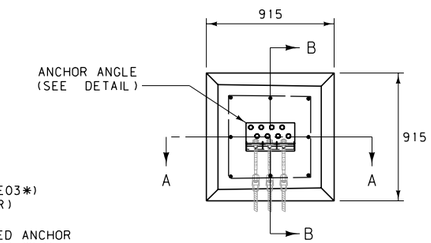
ANCHOR ANGLE ④
DETAIL



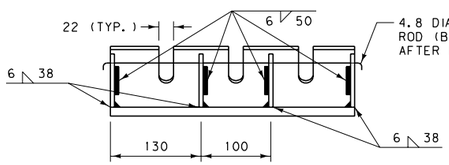
DETAIL B
PLAN



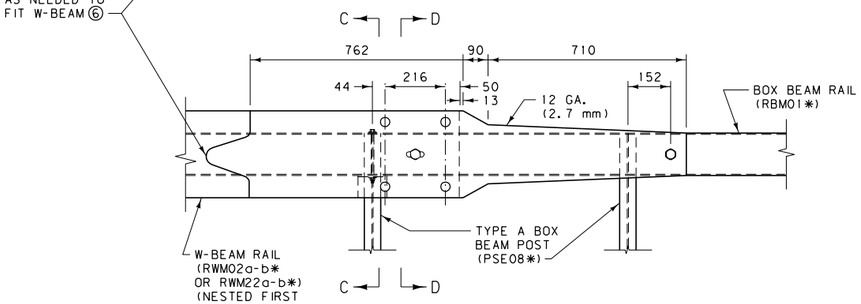
SECTION A-A



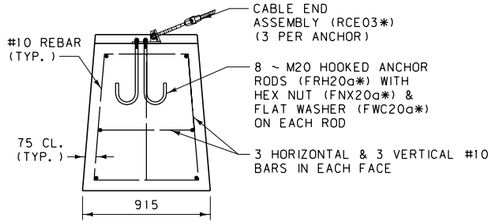
ANCHOR DETAIL ⑤
PLAN



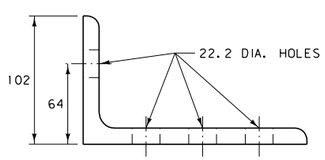
ELEVATION

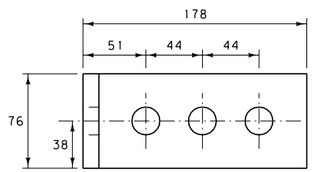


DETAIL B
ELEVATION

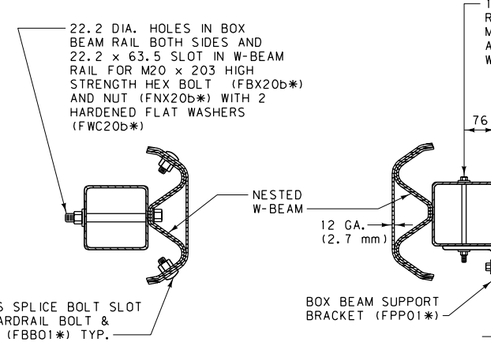


SECTION B-B

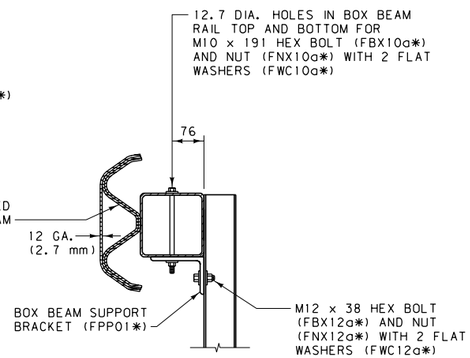




178 x 102 x 12.7 L
DETAIL



SECTION D-D



SECTION C-C

NOTES:

① SEE DTL. DWG. NO. 606-50 FOR STANDARD BOX BEAM GUARDRAIL AND ASSOCIATED DETAILS.

② SEE DTL. DWG. NO. 606-05A AND 606-05B FOR STANDARD W-BEAM GUARDRAIL AND ASSOCIATED DETAILS.

③ MANUFACTURE ANCHOR ANGLES USING AASHTO M 270M GRADE 250 STEEL. ALL WELDING IS TO CONFORM TO THE APPLICABLE AWS CODE.

④ GALVANIZE ANCHOR ANGLES IN ACCORDANCE WITH AASHTO M 111M. NO PUNCHING, DRILLING, WELDING OR CUTTING IS PERMITTED ON COMPONENTS AFTER GALVANIZING.

⑤ USE CLASS "DD" CONCRETE TO CONSTRUCT ANCHOR.

⑥ ANY HOLES, CUTS, SLOTS OR WELDS MADE ON THE W-BEAM OR BOX BEAM RAIL AFTER GALVANIZING IS TO BE PAINTED WITH AN APPROVED GALVANIZING PAINT.

⑦ LAP ALL W-BEAM SPLICES IN THE DIRECTION OF ADJACENT TRAFFIC.

✱ SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-58

BOX BEAM TO W-BEAM TRANSITION SECTION

--REVISED--
January 2008

EFFECTIVE: FEBRUARY 2005

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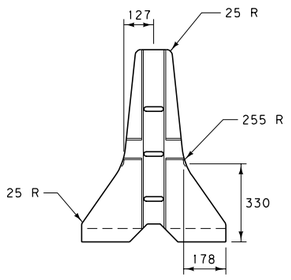
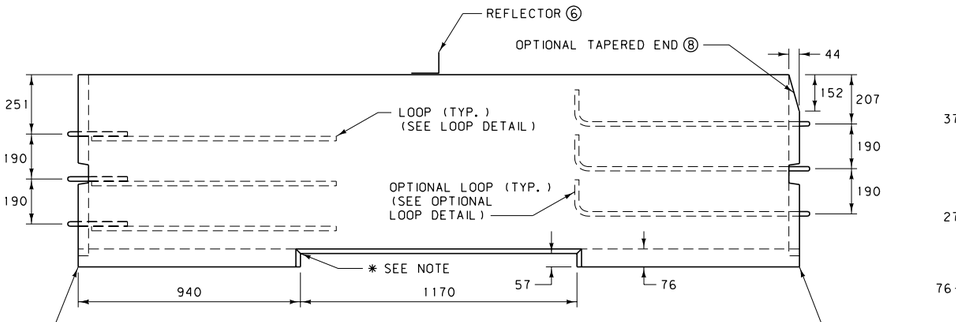
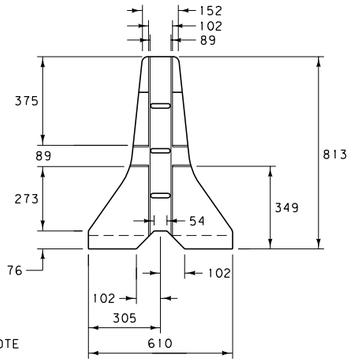


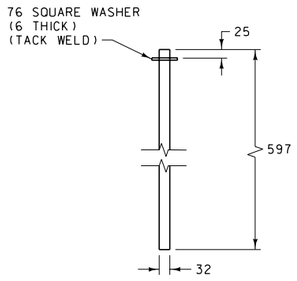
END VIEW



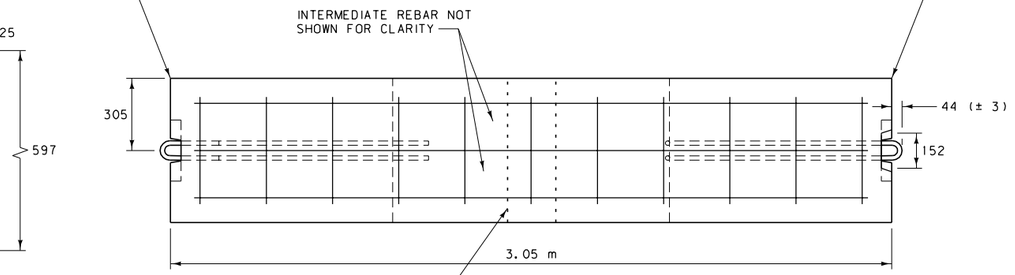
ELEVATION VIEW



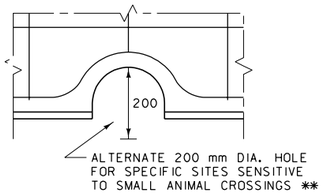
END VIEW



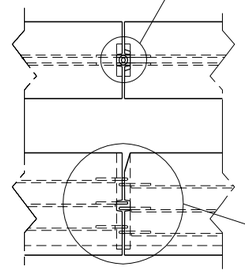
CONNECTING PIN DETAIL

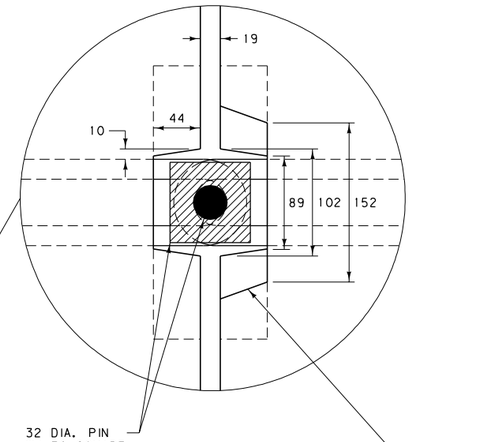


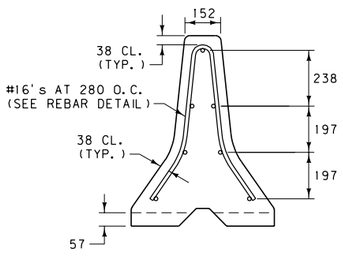
PLAN VIEW



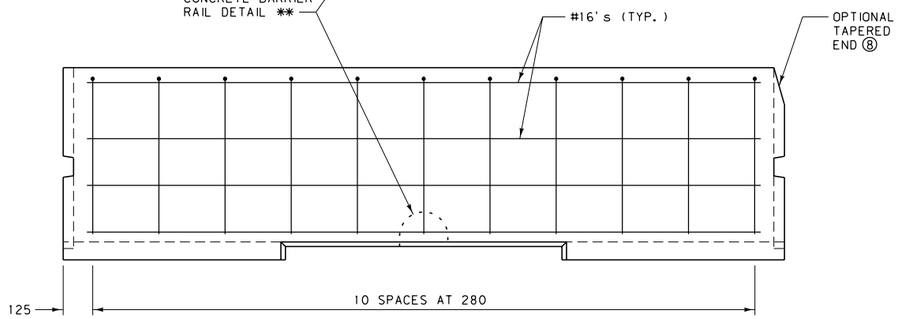
ALTERNATE CONCRETE BARRIER
RAIL DETAIL



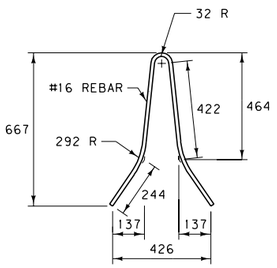




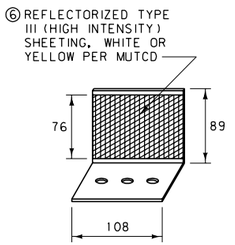
END VIEW



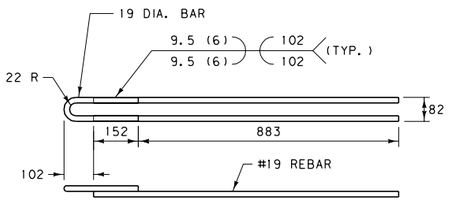
ELEVATION VIEW



REBAR DETAIL



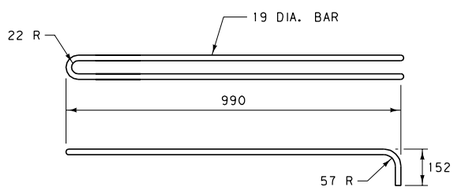
REFLECTOR
(SEE NOTES)



LOOP DETAIL

LOOP FABRICATION REQUIREMENTS:

1. USE REINFORCING STEEL CONFORMING TO ASTM A 706M, GRADE 420 FOR REBAR BEING WELDED TO LOOPS.
2. LOOP ENDS CONSIST OF SMOOTH ROUND BARS CONFORMING TO AASHTO M 270M, GRADE 250.
3. COLD BEND THE LOOPS BY USING A JIG THAT WILL PRODUCE AN ACCURATE RADIUS WITHOUT MARRING THE BAR. DO NOT HEAT THE BAR TO FACILITATE BENDING.
4. WELD REBAR TO LOOPS USING 3 mm DIA. E8018 ROD. DO NOT TACK WELD THE PIECES TOGETHER PRIOR TO WELDING.
5. USE A CERTIFIED WELDER IN ACCORDANCE WITH THE CURRENT EDITION OF AWS D1.4. DO NOT PLACE THE WELDED ASSEMBLY IN THE FORM UNTIL IT HAS BEEN INSPECTED.
6. NO ADDITIONAL WELDING IS PERMITTED ON THE SMOOTH ROUND BARS OR REINFORCING STEEL.



OPTIONAL LOOP DETAIL

OPTIONAL LOOP FABRICATION REQUIREMENTS:

1. USE CONTINUOUS SMOOTH ROUND BARS CONFORMING TO AASHTO M 270M, GRADE 250 TO FABRICATE THE OPTIONAL LOOPS.
2. COLD BEND THE LOOPS BY USING A JIG THAT WILL PRODUCE AN ACCURATE RADIUS WITHOUT MARRING THE BAR. DO NOT HEAT THE BAR TO FACILITATE BENDING.
3. NO WELDING IS PERMITTED ON THE SMOOTH ROUND BARS OR REINFORCING STEEL.

NOTES:

① USE CLASS "DD" CONCRETE OR EQUIVALENT.

② REINFORCING STEEL CONSISTS OF DEFORMED BARS CONFORMING TO AASHTO M 31M, GRADE 420.

③ CONNECT EACH 3.05 m SECTION WITH CONNECTING PINS AS DETAILED AND CONFORMING TO AASHTO M 270M, GRADE 250 OR BETTER. CONNECTING PINS NEED NOT BE PAINTED.

④ CUTOUTS ON ENDS OF EACH SECTION ARE SHOWN WITH SLIGHT TAPER TO FACILITATE FORM REMOVAL. RECTANGULAR CUTOUTS ARE ACCEPTABLE.

⑤ THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER FIT-UP OF THE PRECAST CONCRETE BARRIER RAIL. ASSEMBLE AND PIN SUFFICIENT NUMBER OF PRECAST SECTIONS IN THE FABRICATIONS PLANT TO DETERMINE THAT PROPER FIT-UP CAN BE MAINTAINED ON ALL ROADWAY ALIGNMENT, CURVES AS WELL AS ON TANGENT. THIS IS TO BE DETERMINED EARLY IN FABRICATION.

⑥ ATTACH REFLECTORS TO RAIL EVERY 9.15 METERS. FOLLOW THE MANUFACTURER'S SPECIFICATIONS FOR ADHESIVE MOUNTING. IN NARROW PAVED (FLUSH) MEDIAN APPLICATIONS, REFLECTORIZE BOTH SIDES.

⑦ DO NOT INSTALL UN-ANCHORED CONCRETE BARRIER RAIL FOR OBSTACLES WITHIN 2.0 m OF THE BASE (TRAFFIC SIDE) OF THE RAIL. SEE DTL. DWG. NO. 606-62 FOR CONCRETE BARRIER RAIL ANCHORS.

⑧ THE OPTIONAL TAPERED END SHOWN IS AN ACCEPTABLE ALTERNATE TO THE VERTICAL END FOR ALL CONCRETE BARRIER RAIL ENDS.

* 19 mm CHAMFER ENTIRE OPENING (OR SUFFICIENTLY ROUNDED SO THAT A SMOOTH EDGE RESULTS.) 13 mm CHAMFER IS ACCEPTABLE.

** USE THE ALTERNATE 200 mm DIA. HOLE IN THIS RAIL ON A CASE-BY-CASE BASIS AS SPECIFIED IN THE PLANS.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 554, 606

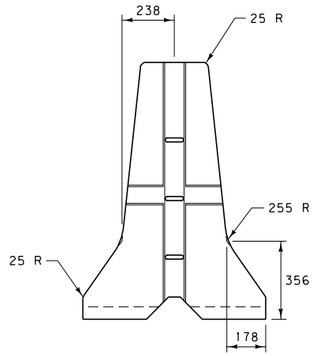
DWG. NO. 606-60

CONCRETE BARRIER RAIL

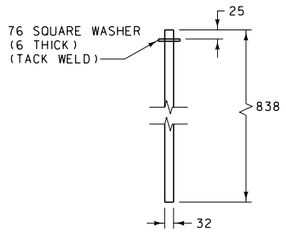
--REVISED--
January 2008

EFFECTIVE: APRIL 2006

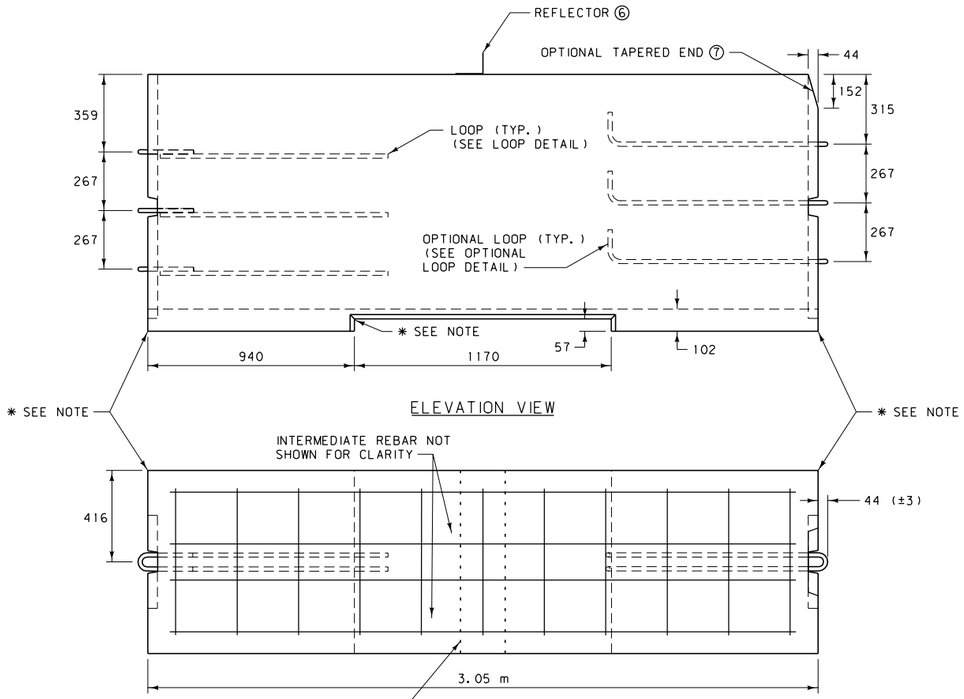
MDT serving you with pride — MONTANA DEPARTMENT OF TRANSPORTATION



END VIEW

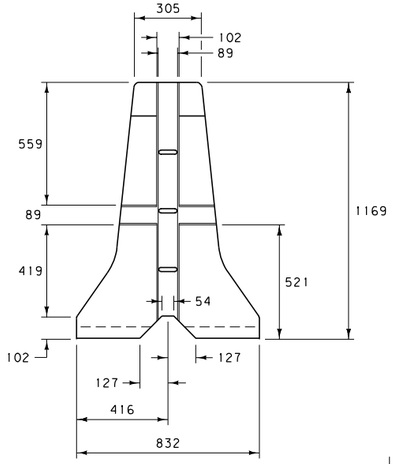


CONNECTING PIN DETAIL

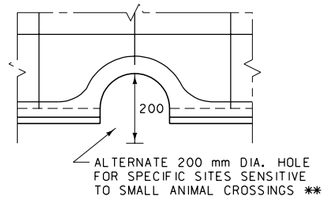


ELEVATION VIEW

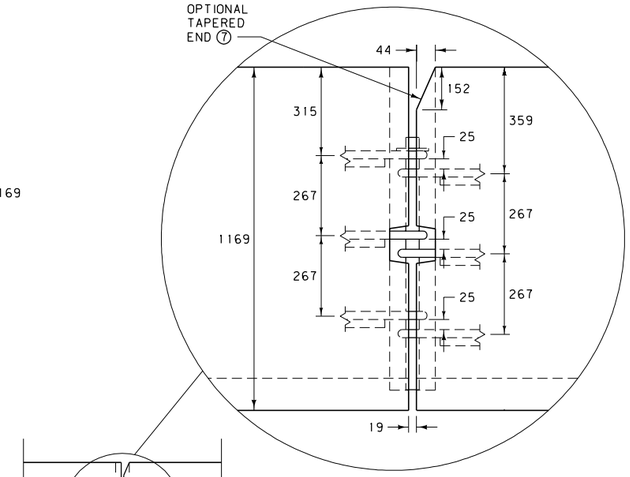
PLAN VIEW

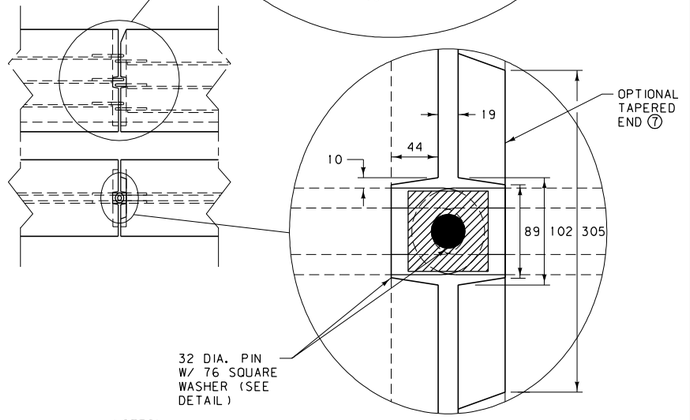


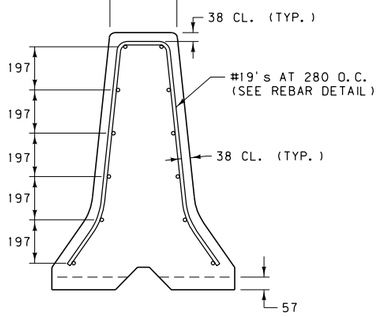
END VIEW



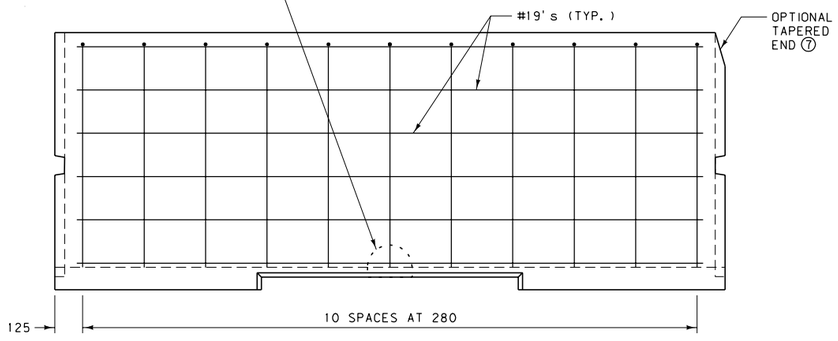
ALTERNATE TALL CONCRETE
BARRIER RAIL DETAIL



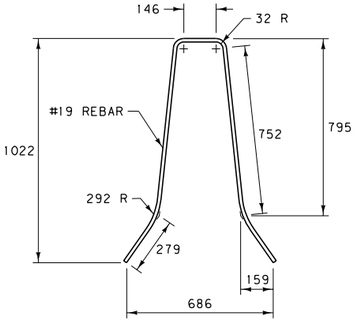




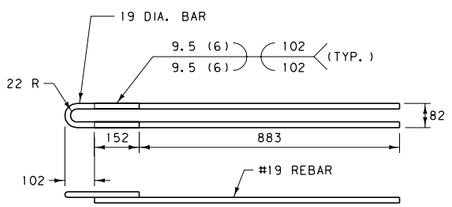
END VIEW



ELEVATION VIEW



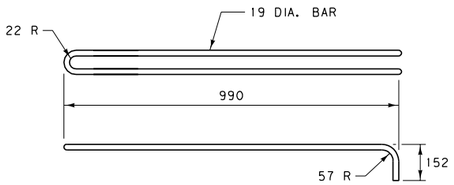
REBAR DETAIL



LOOP DETAIL

LOOP FABRICATION REQUIREMENTS:

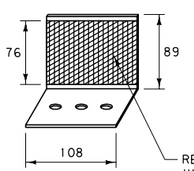
1. USE REINFORCING STEEL CONFORMING TO ASTM A 706M, GRADE 420 FOR REBAR BEING WELDED TO LOOPS.
2. LOOP ENDS CONSIST OF SMOOTH ROUND BARS CONFORMING TO AASHTO M 270M, GRADE 250.
3. COLD BEND THE LOOPS BY USING A JIG THAT WILL PRODUCE AN ACCURATE RADIUS WITHOUT MARRING THE BAR. DO NOT HEAT THE BAR TO FACILITATE BENDING.
4. WELD REBAR TO LOOPS USING 3 mm DIA. E8018 ROD. DO NOT TACK WELD THE PIECES TOGETHER PRIOR TO WELDING.
5. USE A CERTIFIED WELDER IN ACCORDANCE WITH THE CURRENT EDITION OF AWS D1.4. DO NOT PLACE THE WELDED ASSEMBLY IN THE FORM UNTIL IT HAS BEEN INSPECTED.
6. NO ADDITIONAL WELDING IS PERMITTED ON THE SMOOTH ROUND BARS OR REINFORCING STEEL.



OPTIONAL LOOP DETAIL

OPTIONAL LOOP FABRICATION REQUIREMENTS:

1. USE CONTINUOUS SMOOTH ROUND BARS CONFORMING TO AASHTO M 270M, GRADE 250 TO FABRICATE THE OPTIONAL LOOPS.
2. COLD BEND THE LOOPS BY USING A JIG THAT WILL PRODUCE AN ACCURATE RADIUS WITHOUT MARRING THE BAR. DO NOT HEAT THE BAR TO FACILITATE BENDING.
3. NO WELDING IS PERMITTED ON THE SMOOTH ROUND BARS OR REINFORCING STEEL.



REFLECTOR
(SEE NOTES)

NOTES:

① USE CLASS "DD" CONCRETE OR EQUIVALENT.

② REINFORCING STEEL CONSISTS OF DEFORMED BARS CONFORMING TO AASHTO M 31M, GRADE 420.

③ CONNECT EACH 3.05 m SECTION WITH CONNECTING PINS AS DETAILED AND CONFORMING TO AASHTO M 270M, GRADE 250 OR BETTER. CONNECTING PINS NEED NOT BE PAINTED.

④ CUTOUTS ON ENDS OF EACH SECTION ARE SHOWN WITH SLIGHT TAPER TO FACILITATE FORM REMOVAL. RECTANGULAR CUTOUTS ARE ACCEPTABLE.

⑤ THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER FIT-UP OF THE PRECAST CONCRETE BARRIER RAIL. ASSEMBLE AND PIN SUFFICIENT NUMBER OF PRECAST SECTIONS IN THE FABRICATIONS PLANT TO DETERMINE THAT PROPER FIT-UP CAN BE MAINTAINED ON ALL ROADWAY ALIGNMENT, CURVES AS WELL AS ON TANGENT. THIS IS TO BE DETERMINED EARLY IN FABRICATION.

⑥ ATTACH REFLECTORS TO RAIL EVERY 9.15 m. FOLLOW THE MANUFACTURER'S SPECIFICATIONS FOR ADHESIVE MOUNTING. IN NARROW PAVED (FLUSH) MEDIAN APPLICATIONS, REFLECTORIZE BOTH SIDES.

⑦ THE OPTIONAL TAPERED END SHOWN IS AN ACCEPTABLE ALTERNATE TO THE VERTICAL END FOR ALL CONCRETE BARRIER RAIL ENDS.

* 19 mm CHAMFER ENTIRE OPENING (OR SUFFICIENTLY ROUNDED SO THAT A SMOOTH EDGE RESULTS.) 13 mm CHAMFER IS ACCEPTABLE.

** USE THE ALTERNATE 200 mm DIA. HOLE IN THIS RAIL ON A CASE-BY-CASE BASIS AS SPECIFIED IN PLANS.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 554, 606

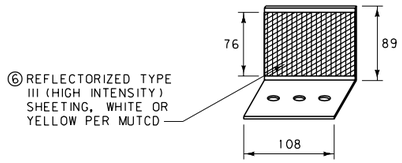
DWG. NO. 606-64

TALL CONCRETE BARRIER RAIL

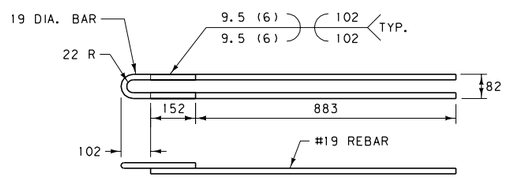
--REVISED--
January 2008

EFFECTIVE: FEBRUARY 2005

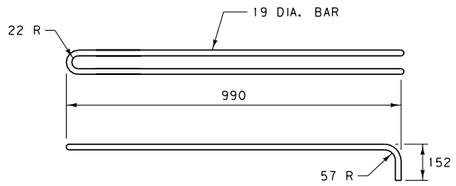
MDT serving you with pride — MONTANA DEPARTMENT OF TRANSPORTATION



REFLECTOR
(SEE NOTES)



LOOP DETAIL



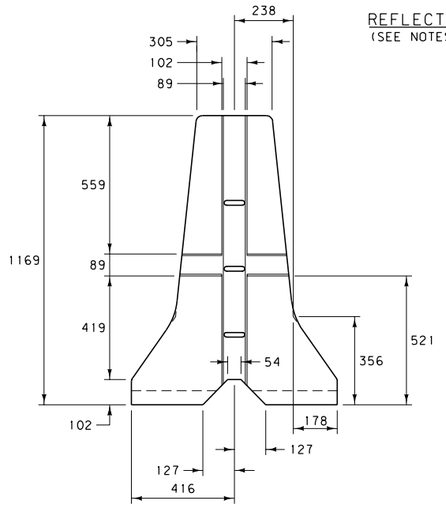
OPTIONAL LOOP DETAIL

LOOP FABRICATION REQUIREMENTS:

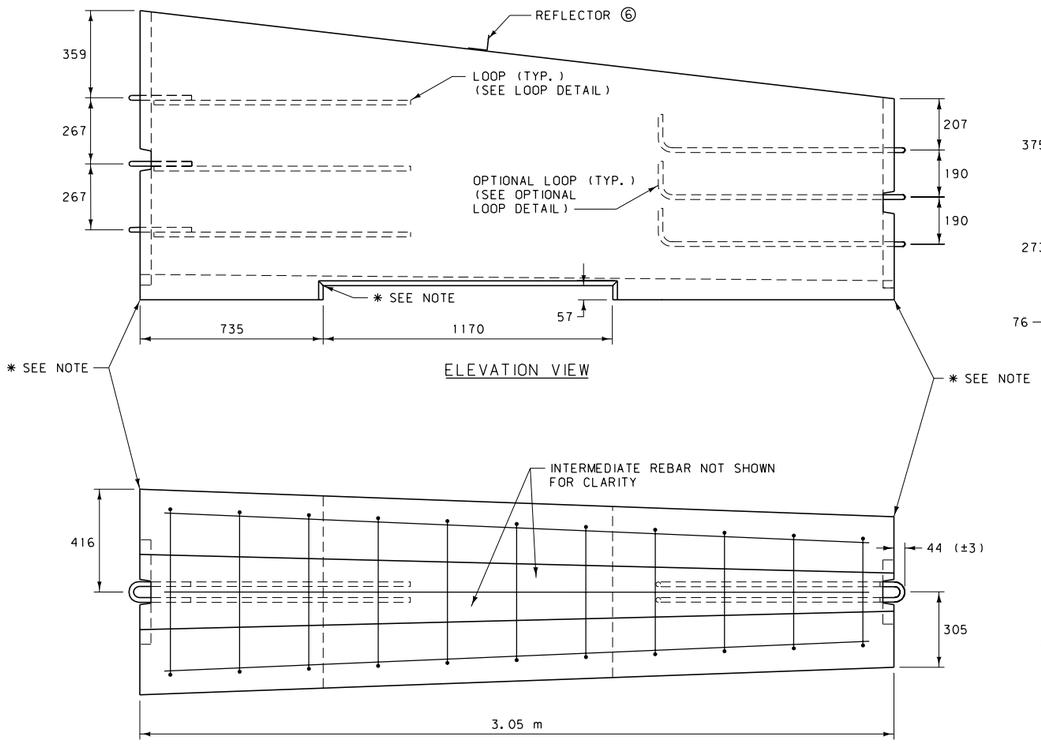
1. USE REINFORCING STEEL CONFORMING TO ASTM A 706M, GRADE 420 FOR REBAR BEING WELDED TO LOOPS.
2. LOOP ENDS CONSIST OF SMOOTH ROUND BARS CONFORMING TO AASHTO M 270M, GRADE 250.
3. COLD BEND THE LOOPS BY USING A JIG THAT WILL PRODUCE AN ACCURATE RADIUS WITHOUT MARRING THE BAR. DO NOT HEAT THE BAR TO FACILITATE BENDING.
4. WELD REBAR TO LOOPS USING 3 mm DIA. E8018 ROD. DO NOT TACK WELD THE PIECES TOGETHER PRIOR TO WELDING.
5. USE A CERTIFIED WELDER IN ACCORDANCE WITH THE CURRENT EDITION OF AWS D1.4. DO NOT PLACE THE WELDED ASSEMBLY IN THE FORM UNTIL IT HAS BEEN INSPECTED.
6. NO ADDITIONAL WELDING IS PERMITTED ON THE SMOOTH ROUND BARS OR REINFORCING STEEL.

OPTIONAL LOOP FABRICATION REQUIREMENTS:

1. USE CONTINUOUS SMOOTH ROUND BARS CONFORMING TO AASHTO M 270M, GRADE 250 TO FABRICATE THE OPTIONAL LOOPS.
2. COLD BEND THE LOOPS BY USING A JIG THAT WILL PRODUCE AN ACCURATE RADIUS WITHOUT MARRING THE BAR. DO NOT HEAT THE BAR TO FACILITATE BENDING.
3. NO WELDING IS PERMITTED ON THE SMOOTH ROUND BARS OR REINFORCING STEEL.

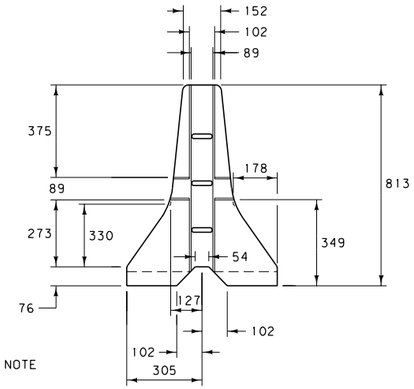


LEFT END VIEW

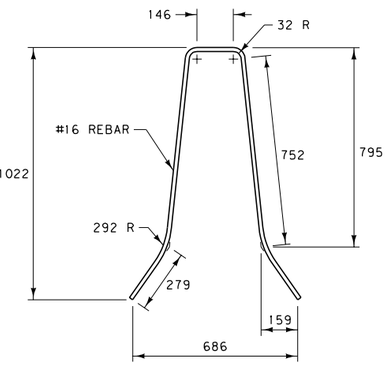


ELEVATION VIEW

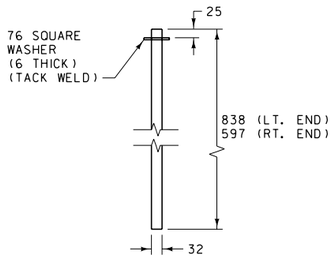
PLAN VIEW



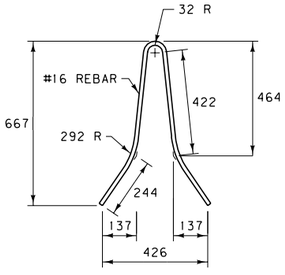
RIGHT END VIEW



REBAR DETAIL LEFT END



CONNECTING PIN DETAIL



REBAR DETAIL RIGHT END

NOTES:

① USE CLASS "DD" CONCRETE OR EQUIVALENT.

② REINFORCING STEEL CONSISTS OF DEFORMED BARS CONFORMING TO AASHTO M 31M, GRADE 420.

③ CONNECT EACH 3.05 m SECTION WITH CONNECTING PINS AS DETAILED AND CONFORMING TO AASHTO M 270M, GRADE 250 OR BETTER. CONNECTING PINS NEED NOT BE PAINTED.

④ CUTOUTS ON ENDS OF EACH SECTION ARE SHOWN WITH SLIGHT TAPER TO FACILITATE FORM REMOVAL. RECTANGULAR CUTOUTS ARE ACCEPTABLE.

⑤ THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER FIT-UP OF THE PRECAST CONCRETE BARRIER RAIL. ASSEMBLE AND PIN SUFFICIENT NUMBER OF PRECAST SECTIONS IN THE FABRICATIONS PLANT TO DETERMINE THAT PROPER FIT-UP CAN BE MAINTAINED ON ALL ROADWAY ALIGNMENT, CURVES AS WELL AS ON TANGENT. THIS IS TO BE DETERMINED EARLY IN FABRICATION.

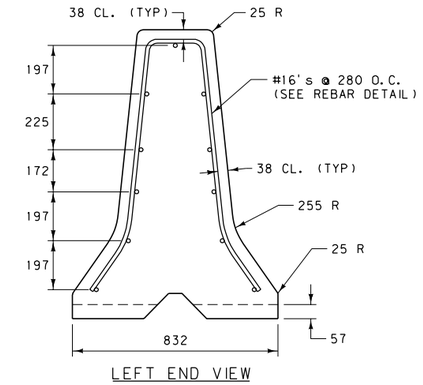
⑥ ATTACH REFLECTORS TO RAIL EVERY 9.15 m. FOLLOW THE MANUFACTURER'S SPECIFICATIONS FOR ADHESIVE MOUNTING. IN NARROW PAVED (FLUSH) MEDIAN APPLICATIONS, REFLECTORIZE BOTH SIDES.

⑦ SEE DETAILED DRAWINGS 606-60 AND 606-64 FOR INFORMATION ON THE ADJACENT CONCRETE BARRIER RAIL SECTIONS. THE OPTIONAL TAPERED END DETAIL MAY ALSO BE USED HERE.

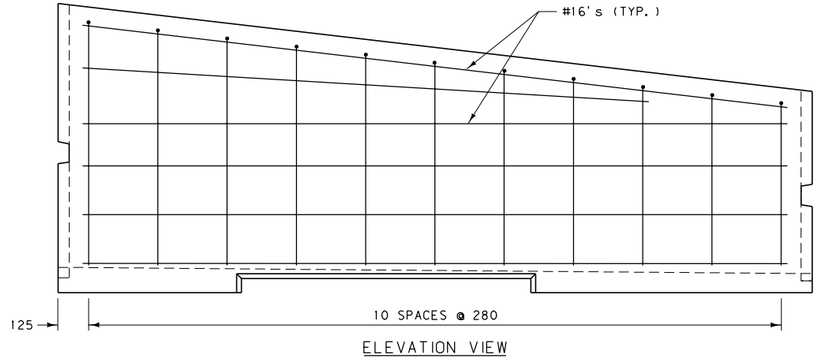
✱ 19 mm CHAMFER ENTIRE OPENING (OR SUFFICIENTLY ROUNDED SO THAT A SMOOTH EDGE RESULTS.) 13 mm CHAMFER IS ACCEPTABLE.

NOTE:

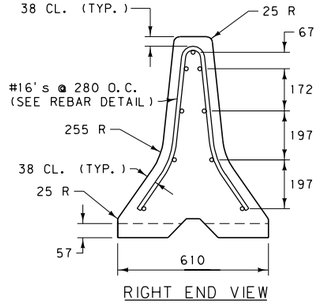
LEFT AND RIGHT REBAR DETAILS ARE FOR NORMAL TALL AND REGULAR CONCRETE BARRIER RAIL SECTIONS. TAPER REBAR HEIGHT AND WIDTH AS NEEDED BY MAINTAINING THE VERTICAL POSITION FROM THE BOTTOM AND THE 38 mm CLEARANCE AT ALL LOCATIONS.



LEFT END VIEW



ELEVATION VIEW



RIGHT END VIEW

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 554, 606

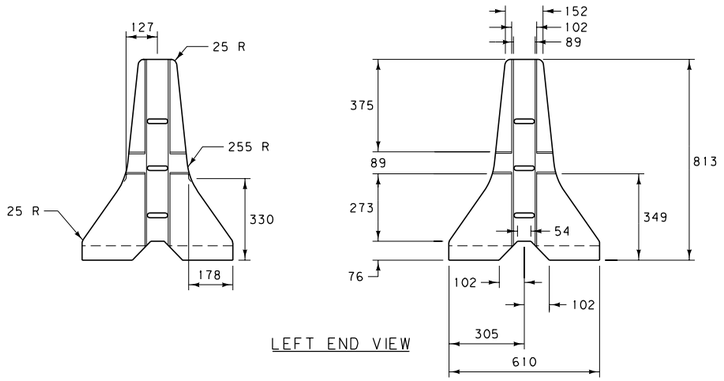
DWG. NO. 606-66

CONCRETE BARRIER RAIL TRANSITION

--REVISED-- January 2008

EFFECTIVE: FEBRUARY 2005

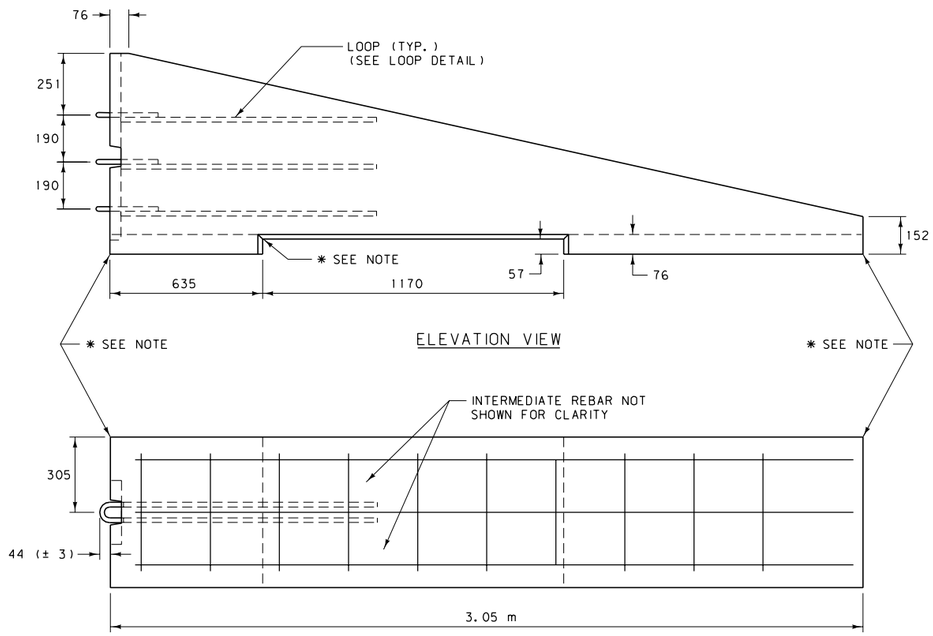
MDT serving you with pride — MONTANA DEPARTMENT OF TRANSPORTATION



LEFT END VIEW

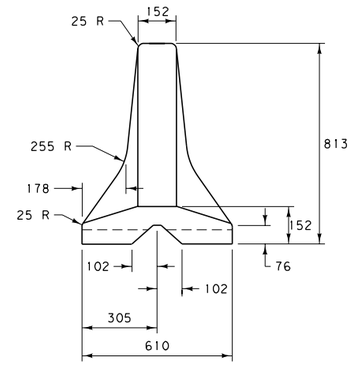
NOTE:

REBAR TYPICAL AT LEFT END ONLY. TAPER THE REBAR HEIGHT AS NEEDED, BY MAINTAINING THE VERTICAL POSITION FROM THE BOTTOM AND THE 38 mm CLEARANCE AT ALL LOCATIONS.



ELEVATION VIEW

PLAN VIEW



RIGHT END VIEW

NOTES:

① USE CLASS "DD" CONCRETE OR EQUIVALENT.

② REINFORCING STEEL CONSISTS OF DEFORMED BARS CONFORMING TO AASHTO M 31M, GRADE 420.

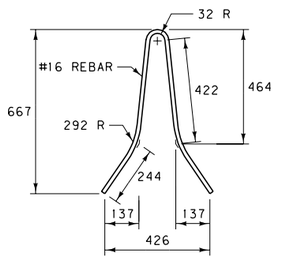
③ CONNECT EACH 3.05 m SECTION WITH CONNECTING PINS AS DETAILED AND CONFORMING TO AASHTO M 270M, GRADE 250 OR BETTER. CONNECTING PINS NEED NOT BE PAINTED.

④ CUTOUTS ON LEFT END OF EACH SECTION ARE SHOWN WITH SLIGHT TAPER TO FACILITATE FORM REMOVAL. RECTANGULAR CUTOUTS ARE ACCEPTABLE.

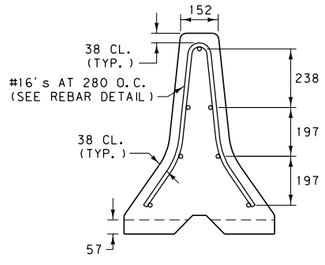
⑤ THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER FIT-UP OF THE PRECAST CONCRETE BARRIER RAIL. ASSEMBLE AND PIN SUFFICIENT NUMBER OF PRECAST SECTIONS IN THE FABRICATIONS PLANT TO DETERMINE THAT PROPER FIT-UP CAN BE MAINTAINED ON ALL ROADWAY ALIGNMENT, CURVES AS WELL AS ON TANGENT. THIS IS TO BE DETERMINED EARLY IN FABRICATION.

⑥ SEE DTL. DWG. NO. 606-60 FOR INFORMATION ON THE ADJACENT CONCRETE BARRIER RAIL SECTION. THE OPTIONAL TAPERED END DETAIL MAY ALSO BE USED HERE.

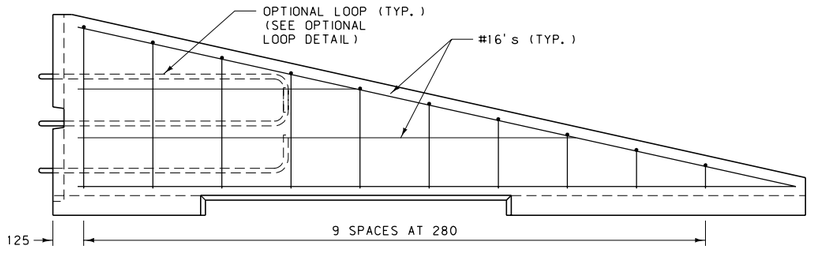
* 19 mm CHAMFER ENTIRE OPENING (OR SUFFICIENTLY ROUNDED SO THAT A SMOOTH EDGE RESULTS.) 13 mm CHAMFER IS ACCEPTABLE.



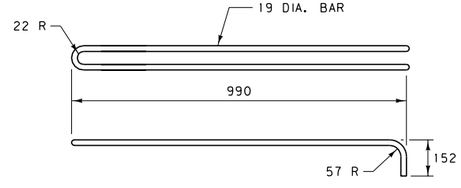
REBAR DETAIL LEFT END



LEFT END VIEW



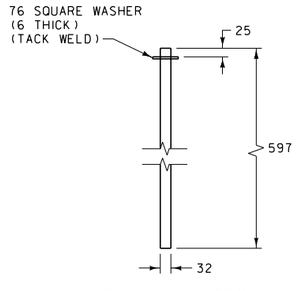
ELEVATION VIEW



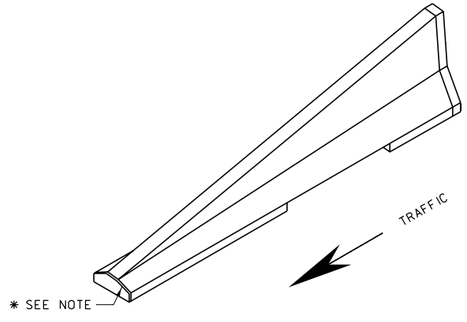
OPTIONAL LOOP DETAIL

OPTIONAL LOOP FABRICATION REQUIREMENTS:

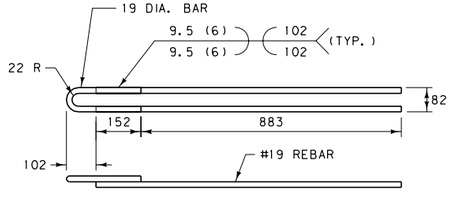
1. USE CONTINUOUS SMOOTH ROUND BARS CONFORMING TO AASHTO M 270M, GRADE 250 TO FABRICATE THE OPTIONAL LOOPS.
2. COLD BEND THE LOOPS BY USING A JIG THAT WILL PRODUCE AN ACCURATE RADIUS WITHOUT MARRING THE BAR. DO NOT HEAT THE BAR TO FACILITATE BENDING.
3. NO WELDING IS PERMITTED ON THE SMOOTH ROUND BARS OR REINFORCING STEEL.



CONNECTING PIN DETAIL



ISOMETRIC VIEW



LOOP DETAIL

LOOP FABRICATION REQUIREMENTS:

1. USE REINFORCING STEEL CONFORMING TO ASTM A 706M, GRADE 420 FOR REBAR BEING WELDED TO LOOPS.
2. LOOP ENDS CONSIST OF SMOOTH ROUND BARS CONFORMING TO AASHTO M 270M, GRADE 250.
3. COLD BEND THE LOOPS BY USING A JIG THAT WILL PRODUCE AN ACCURATE RADIUS WITHOUT MARRING THE BAR. DO NOT HEAT THE BAR TO FACILITATE BENDING.
4. WELD REBAR TO LOOPS USING 3 mm DIA. E8018 ROD. DO NOT TACK WELD THE PIECES TOGETHER PRIOR TO WELDING.
5. USE A CERTIFIED WELDER IN ACCORDANCE WITH THE CURRENT EDITION OF AWS D1.4. DO NOT PLACE THE WELDED ASSEMBLY IN THE FORM UNTIL IT HAS BEEN INSPECTED.
6. NO ADDITIONAL WELDING IS PERMITTED ON THE SMOOTH ROUND BARS OR REINFORCING STEEL.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 554, 606

DWG. NO. 606-68

CONCRETE BARRIER RAIL TERMINAL SECTION (ONE-WAY DEPARTURE)

--REVISED--
January 2008

EFFECTIVE: FEBRUARY 2005

MDT serving you with pride

MONTANA DEPARTMENT OF TRANSPORTATION

SCHEDULE OF GUARDRAIL HARDWARE

DESIGNATION ①	DESCRIPTION	DTL. DWG. NO. (606-###)	GUARDRAIL TYPE ②	DTL. DWGS. WHERE PARTS USED: 606-05A	606-05B	606-09	606-11A	606-11B	606-18	606-24A	606-24B	606-25A	606-25B	606-40	606-41	606-46	606-50	606-52	606-53	606-53A	606-54	606-58
FBB01-05	M16 GUARDRAIL BOLT AND RECESSED NUT	82	W	X	X	X	X	X	X							X						X
FBH01	M8 HOOK BOLT	92	C											X								
FBH02	M8 ALTERNATE HOOK BOLT	92	C											X								
FBX10a	M10 HEX BOLT	82	B														X	X	X	X		X
FBX12a	M12 HEX BOLT	82	B, C												X		X	X	X	X		X
FBX14a	M14 HEX BOLT	82	B																			X
FBX16a	M16 HEX BOLT	82	W						X							X						
FBX20a	M20 HEX BOLT	82	W													X						
FBX20b	M20 HIGH STRENGTH HEX BOLT	82	B														X		X	X	X	X
FBX22b	M22 HIGH STRENGTH HEX BOLT	82	W							X	X											
FBX24b	M24 HIGH STRENGTH HEX BOLT	82	B																	X		
FCA01	CABLE ASSEMBLY	84	W						X							X						
FMM01	CABLE WEDGE	94	C											X								
FMM02	POST SLEEVE	84	W						X							X						
FNS20	M20 SQUARE NUT	82	C												X							
FNX08a	M8 HEX NUT	82	C											X								
FNX10a	M10 HEX NUT	82	B														X	X	X	X		X
FNX12a	M12 HEX NUT	82	B, C												X		X	X	X	X		X
FNX14a	M14 HEX NUT	82	B																			X
FNX16a	M16 HEX NUT	82	W						X							X						
FNX20a	M20 HEX NUT	82	C, W												X	X						X
FNX20b	M20 HIGH STRENGTH HEX NUT	82	B																X	X	X	X
FNX22b	M22 HIGH STRENGTH HEX NUT	82	W							X	X											
FNX24a	M24 HEX NUT	82	W						X							X						
FNX24b	M24 HIGH STRENGTH HEX NUT	82	B																	X		
FPA01	GUARDRAIL ANCHOR BRACKET & END PLATE	84	W						X							X						
FPA02	CABLE ANCHOR BRACKET	95	C												X							
FPB01	BEARING PLATE	18 & 46	W						X							X						
FPP01	BOX BEAM SUPPORT BRACKET	97	B														X	X	X	X		X
FRH20a	M20 HOOKED ANCHOR ROD	82	C												X							X
FWC10a	M10 FLAT WASHER	82	B														X	X	X	X		X
FWC12a	M12 FLAT WASHER	82	B, C												X		X	X	X	X		X
FWC14a	M14 FLAT WASHER	82	B																			X
FWC16a	M16 FLAT WASHER	82	W	X	X	X	X	X	X							X						
FWC20a	M20 FLAT WASHER	82	C, W												X	X						X
FWC20b	M20 HARDENED FLAT WASHER	82	B														X		X	X	X	X
FWC24a	M24 FLAT WASHER	82	W						X							X						
FWR03	RECTANGULAR PLATE WASHER	84	W						X													
PDB01	WOOD BLOCKOUT	05A & 05B	W	X	X	X	X	X														
PDE02	WOOD GUARDRAIL POST	05A	W	X			X															
PDE09	CRT POST	46	W			X										X						
PDF01	WOOD BREAKAWAY POST	46	W													X						
PDF03	END POST	18	W						X													
PLS01	SOIL PLATE	92 & 97	B, C											X			X	X	X			
PLS03	SOIL PLATE	46	W													X						
PSE01	CABLE GUARDRAIL LINE POST	92	C											X								
PSE05	TYPE D BOX BEAM POST	97	B																X			
PSE06	CABLE GUARDRAIL ANCHOR POST	95	C												X							
PSE08	TYPE A BOX BEAM POST	97	B														X		X			X
PTE05	STEEL TUBE	46	W													X						
PWE01	STEEL GUARDRAIL POST	05B	W		X			X														
RBM01	BOX BEAM RAIL	98	B														X		X		X	X
RBM05	BOX BEAM TERMINAL RAIL	98	B															X				
RBS01	BOX BEAM SPLICE PLATE	98	B														X					
RCE01	COMPENSATING CABLE END ASSEMBLY	94	C											X								
RCE03	CABLE END ASSEMBLY	94	C												X							X
RCM01	19.1 DIA. CABLE	94	C											X	X							
RWE01a-b	W-BEAM END SECTION (FLARED)	88	W						X													
RWE02a-b	W-BEAM TERMINAL CONNECTOR	88	W							X	X	X	X			X						
RWE06a-b	W-BEAM END SECTION (BUFFER)	88	W													X						
RWM02a-b	W-BEAM (3.81 m LENGTH)	88	W	X	X	X	X	X	X													X
RWM22a-b	W-BEAM (7.62 m LENGTH)	88	W	X	X	X	X	X	X													X
SEC01	CABLE GUARDRAIL TERMINAL ANCHOR ASSEMBLY	41	C											X								

SCHEDULE OF GUARDRAIL HARDWARE

DESIGNATION ①	DESCRIPTION	DTL. DWG. NO. (606-###)	GUARDRAIL TYPE ②	DTL. DWGS. WHERE PARTS USED: 606-05A	606-05B	606-09	606-11A	606-11B	606-18	606-24A	606-24B	606-25A	606-25B	606-40	606-41	606-46	606-50	606-52	606-53	606-53A	606-54	606-58
N/A	TURNBUCKLE CABLE END ASSEMBLY	94	C											X								
N/A	KEEPER PLATE	95	C												X							
N/A	TYPE B BOX BEAM POST	97	B																X			
N/A	SUPPORT BRACKET WITH TS152 x 152 x 4.8 BLOCKOUT	97	B																	X		
N/A	TRANSITION POST	97	B																	X		
N/A	TS152 x 152 x 4.8 BR. APP. SECT. UPPER RAIL NO. 1	98	B																X			
N/A	TS152 x 51 x 6.4 BR. APP. SECT. LOWER RAIL NO. 1	98	B																X			
N/A	TS152 x 51 x 6.4 BR. APP. SECT. LOWER RAIL NO. 2	98	B																X			
N/A	TS152 x 51 TO TS152 x 152 CONNECTION SLEEVE	98	B																X			
N/A	TS152 x 51 CONNECTION SLEEVE	98	B																X			
N/A	TS152 x 152 x 4.8 TRANSITION RAIL	98	B																	X		
N/A	6.4 SHIM PLATE	99	B																	X		
N/A	ANCHOR RAIL SECTION	99	B																	X		
N/A	RUB RAIL ANCHOR BRACKET (JERSEY RAIL)	99	B																	X		
N/A	RUB RAIL ANCHOR BRACKET (VERTICAL BRIDGE RAIL)	99	B																	X		
N/A	TS152 x 51 x 4.8 RUB RAIL	99	B																	X		

NOTES:

① SEE AASHTO-AGC-ARTBA JOINT COMMITTEE TASK FORCE 13 REPORT "A GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE" PUBLICATION FOR ADDITIONAL AND DETAILED HARDWARE SPECIFICATIONS.

② GUARDRAIL TYPE CODES:

W = W-BEAM METAL GUARDRAIL
C = CABLE GUARDRAIL
B = BOX BEAM GUARDRAIL

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606 — DWG. NO. 606-80

SCHEDULE OF GUARDRAIL HARDWARE

--REVISED-- January 2008

EFFECTIVE: FEBRUARY 2005

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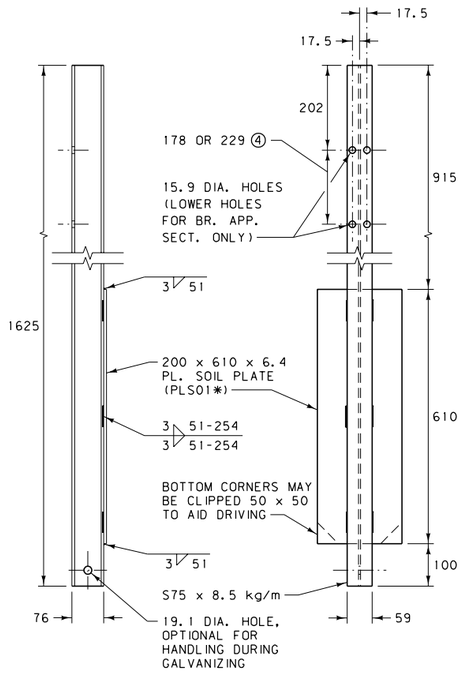
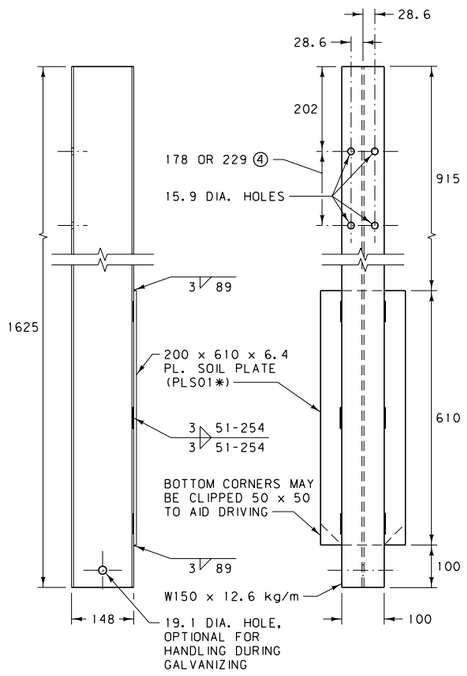


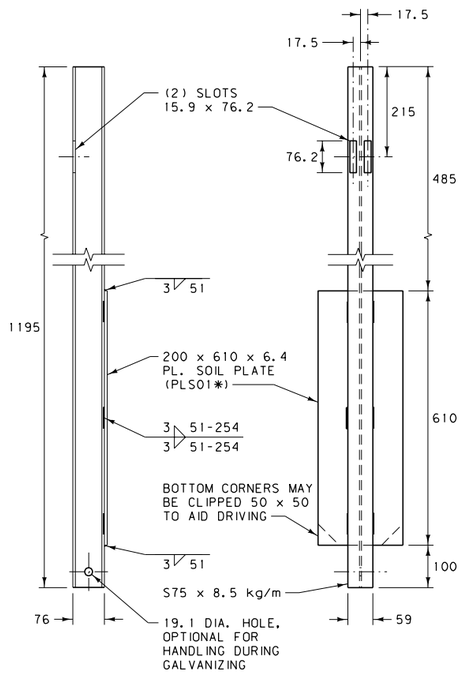
TYPE A BOX BEAM POST AND SOIL PLATE

PSE08* AND PLS01*



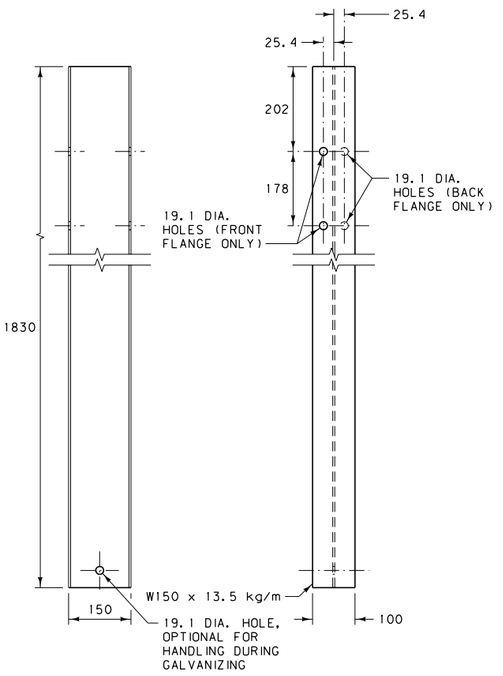
TYPE B BOX BEAM
POST AND SOIL PLATE

PLS01*

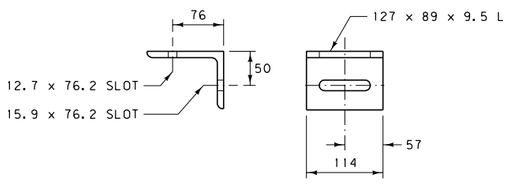


TYPE D BOX BEAM POST AND SOIL PLATE

PSE05* AND PLS01*

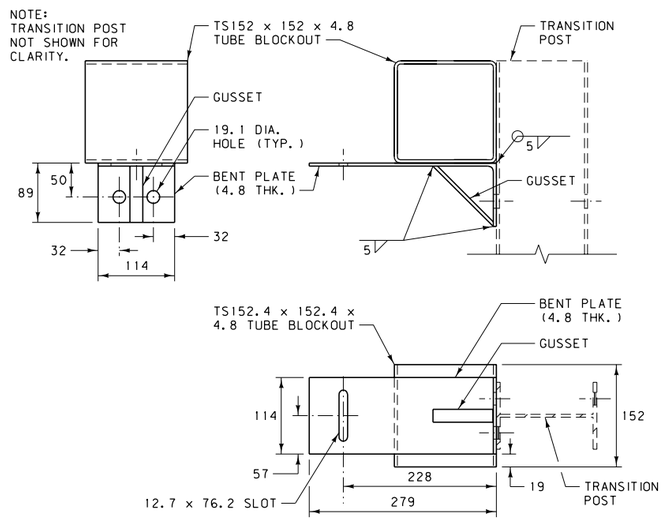


TRANSITION POST

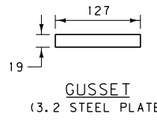


BOX BEAM SUPPORT BRACKET

FPP01*



SUPPORT BRACKET W/BLOCKOUT



GUSSET

(3.2 STEEL PLATE)

NOTES:

① MANUFACTURE POSTS USING STEEL CONFORMING TO AASHTO M 183M (ASTM A 36M). MANUFACTURE SOIL PLATES, SUPPORT BRACKETS AND MISC. COMPONENTS USING AASHTO M 270M (ASTM A 709M) GRADE 250 STEEL. ALL WELDING IS TO CONFORM TO THE APPLICABLE AWS CODE.

② MANUFACTURE BLOCKOUTS FROM EITHER ASTM A 500 GRADE B COLD-ROLLED TUBING, ASTM A 501 HOT-ROLLED TUBING OR AUTOMOTIVE ROLLOVER PROTECTIVE STEEL (ROPS). WHEN ASTM A 500 GRADE B STEEL IS USED, TEST THE MATERIAL PER ASTM E 436.

③ GALVANIZE FABRICATED POSTS, BLOCKOUTS, BRACKETS AND MISC. COMPONENTS IN ACCORDANCE WITH AASHTO M 111M (ASTM A 123M). NO PUNCHING, DRILLING, WELDING OR CUTTING IS PERMITTED ON COMPONENTS AFTER GALVANIZING.

④ SEE DTL. DWG. NO. 606-53 (BOX BEAM BR. APP. SECT.) FOR REQUIRED LOCATION OF LOWER HOLES IN TYPE A AND B POSTS.

* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-97

BOX BEAM GUARDRAIL HARDWARE

--REVISED--
January 2008

EFFECTIVE: FEBRUARY 2005

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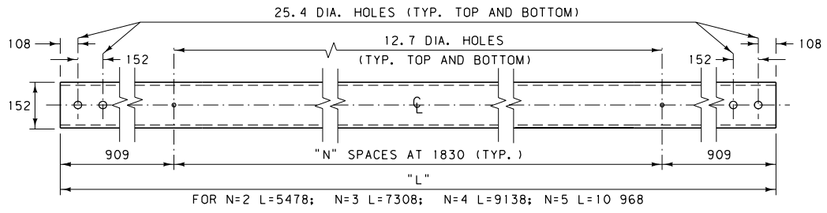
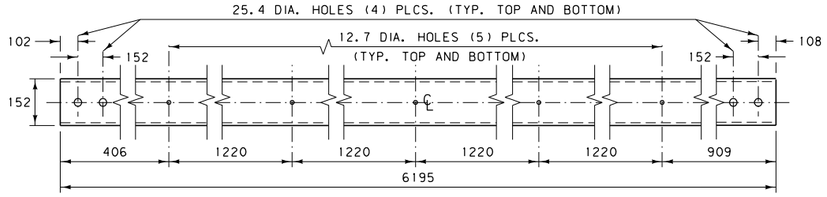


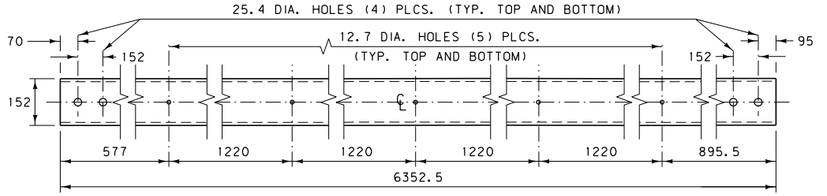
FOR N=2 L=5478; N=3 L=7308; N=4 L=9138; N=5 L=10 968

BOX BEAM RAIL (TS152 x 152 x 4.8)

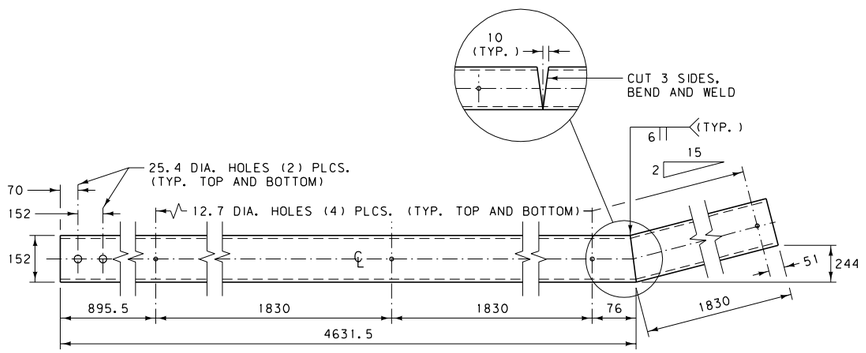
RBM01*



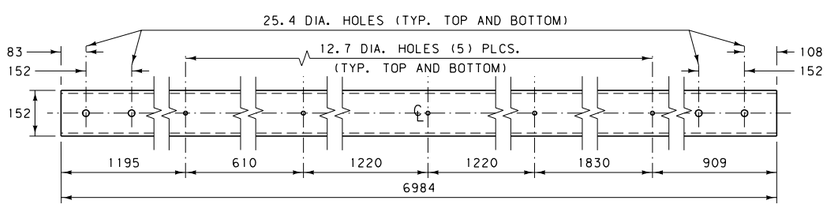
TS152 x 152 x 4.8 BR. APP. SECT. UPPER RAIL NO. 1



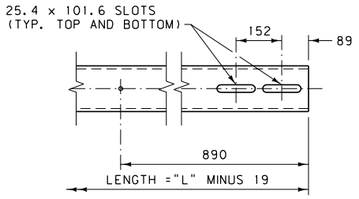
TS152 x 51 x 6.4 BR. APP. SECT. LOWER RAIL NO. 1



TS152 x 51 x 6.4 BR. APP. SECT. LOWER RAIL NO. 2

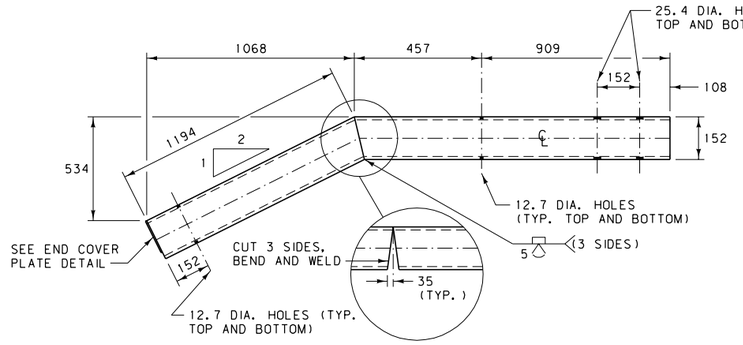


TRANSITION RAIL (TS152 x 152 x 4.8)



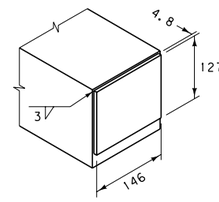
BOX BEAM EXPANSION SPLICE END

ONE END OF BOX BEAM RAIL ONLY. REQUIRED FOR BOTH RAILS AT THE EXPANSION SPLICE.



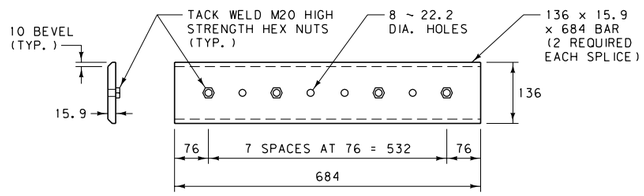
BOX BEAM TERMINAL RAIL (TS152 x 152 x 4.8)

RBM05*



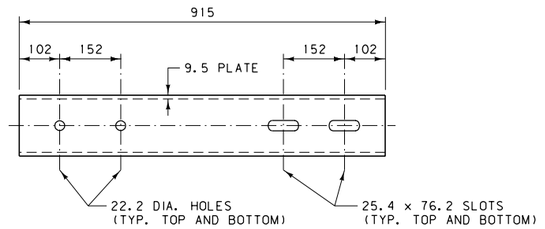
END COVER PLATE DETAIL

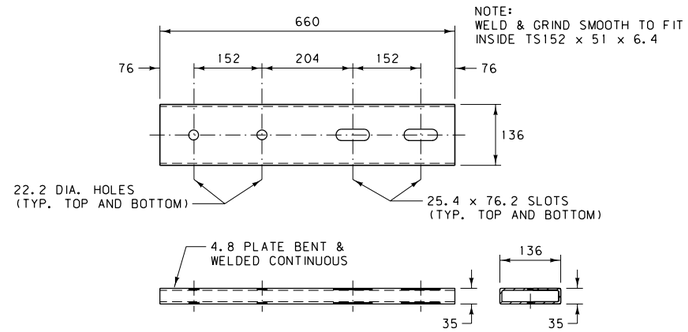
(BAR 127 x 4.8 x 146)



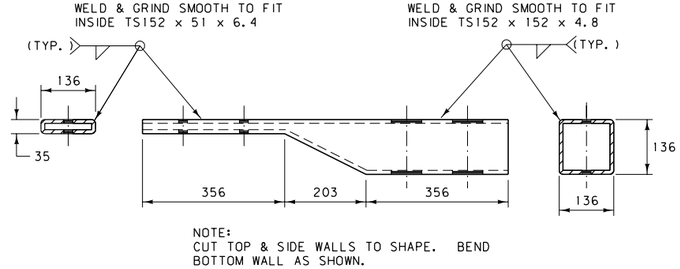
BOX BEAM SPLICE PLATE

RBS01*

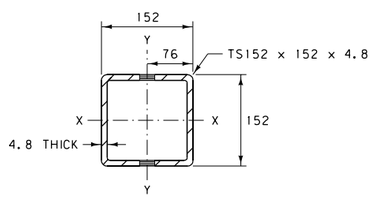




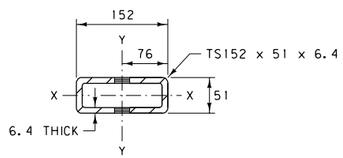
TS152 x 51 CONNECTION SLEEVE



TS152 x 51 TO TS152 x 152 CONNECTION SLEEVE



TS152 x 152 x 4.8 SECTION VIEW



TS152 x 51 x 6.4 SECTION VIEW

NOTES:

1. MANUFACTURE BOX BEAM RAIL ELEMENTS FROM EITHER ASTM A 500 GRADE B COLD ROLLED TUBING, ASTM A 501 HOT-ROLLED TUBING OR AUTOMOTIVE ROLLOVER PROTECTIVE STEEL (ROPS). WHEN ASTM A 500 GRADE B STEEL IS USED, TEST THE MATERIAL PER ASTM E 436.
2. FABRICATE SPLICE PLATES AND CONNECTION SLEEVES FROM AASHTO M 270M (ASTM A 709M) GRADE 250 STEEL PLATE. THE NUTS ARE TO BE PLAIN UN-COATED M20 HIGH STRENGTH HEX NUTS. WELD THE NUTS TO THE PLATES IN ACCORDANCE WITH THE APPLICABLE AWS CODE.
3. GALVANIZE FABRICATED RAIL, CONNECTION SLEEVES, AND SPLICE PLATES IN ACCORDANCE WITH AASHTO M 111M (ASTM A 123M). NO PUNCHING, DRILLING, WELDING OR CUTTING IS PERMITTED ON COMPONENTS AFTER GALVANIZING.

* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-98

BOX BEAM GUARDRAIL HARDWARE

--REVISED-- January 2008

EFFECTIVE: FEBRUARY 2005

MONTANA DEPARTMENT OF TRANSPORTATION

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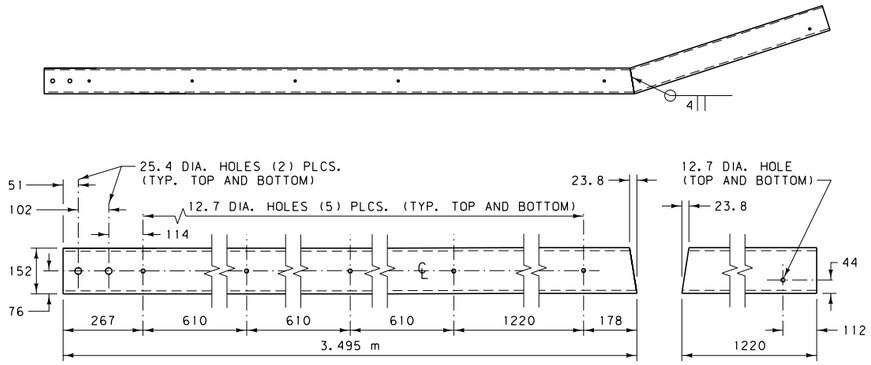
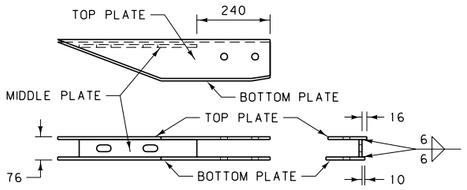
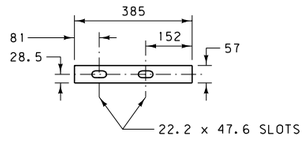


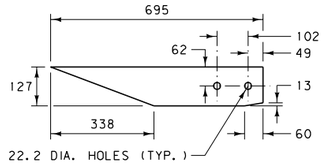
RUB RAIL (TS152 x 51 x 4.8)



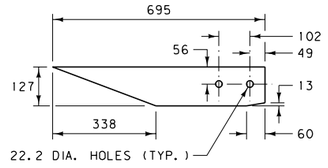
ANCHOR BRACKET FOR RUB RAIL CONNECTION TO JERSEY SHAPE BRIDGE RAIL



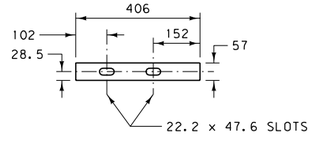
MIDDLE PLATE
(9.5 STEEL PLATE)



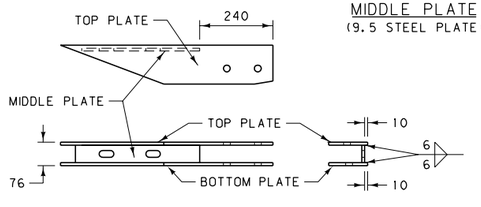
TOP PLATE
(9.5 STEEL PLATE)



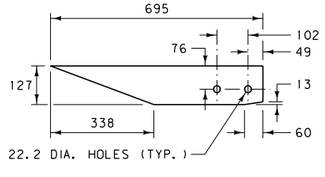
BOTTOM PLATE
(9.5 STEEL PLATE)



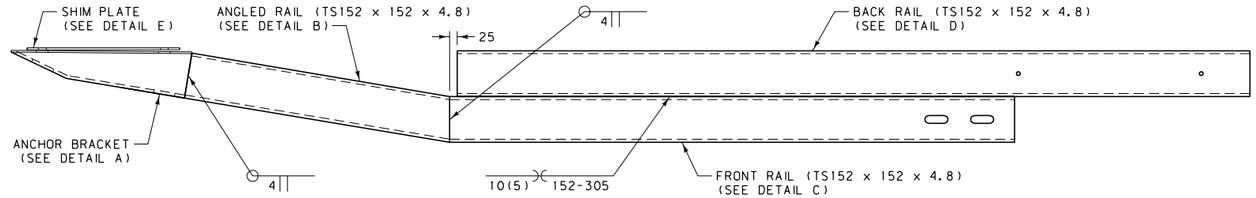
MIDDLE PLATE
(9.5 STEEL PLATE)



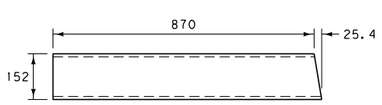
ANCHOR BRACKET FOR RUB RAIL CONNECTION TO VERTICAL CONCRETE BRIDGE RAIL



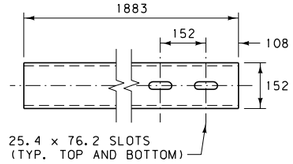
TOP PLATE AND BOTTOM PLATE
(TOP AND BOTTOM PLATES ARE IDENTICAL 9.5 STEEL PLATES FOR CONNECTIONS TO VERTICAL SHAPES.)



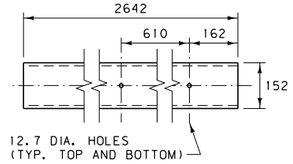
ANCHOR RAIL SECTION



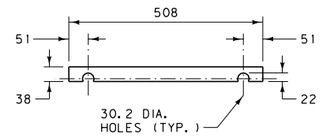
DETAIL B
ANGLED RAIL (TS152 x 152 x 4.8)



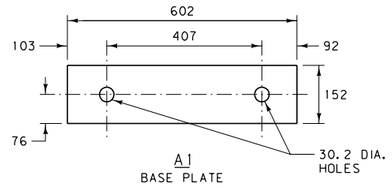
DETAIL C
FRONT RAIL (TS152 x 152 x 4.8)



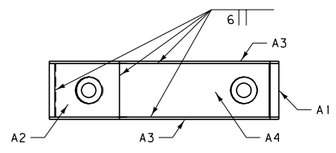
DETAIL D
BACK RAIL (TS152 x 152 x 4.8)



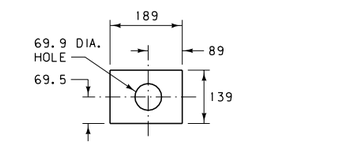
DETAIL E
SHIM PLATE (6.4 STEEL PLATE)



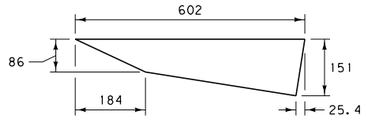
A1
BASE PLATE



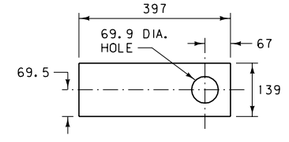
DETAIL A
ANCHOR BRACKET



A2
FRONT LEFT PLATE

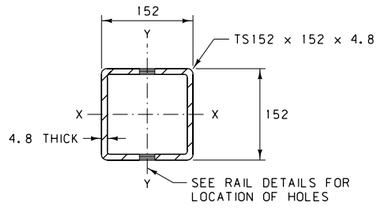


A3
TOP AND BOTTOM PLATE

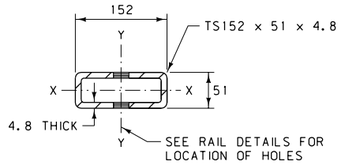


A4
FRONT RIGHT PLATE

NOTE:
ALL ANCHOR BRACKET COMPONENTS ARE FABRICATED FROM 6.4 STEEL PLATE MATERIAL.



TS152 x 152 x 4.8 SECTION VIEW



TS152 x 51 x 4.8 SECTION VIEW

NOTES:

1. MANUFACTURE BOX BEAM RAIL ELEMENTS FROM EITHER ASTM A 500 GRADE B COLD ROLLED TUBING, ASTM A 501 HOT-ROLLED TUBING OR AUTOMOTIVE ROLLOVER PROTECTIVE STEEL (ROPS). WHEN ASTM A 500 GRADE B STEEL IS USED, TEST THE MATERIAL PER ASTM E 436.
2. FABRICATE ANCHOR BRACKET AND RUB RAIL CONNECTION COMPONENTS FROM AASHTO M 270M (ASTM A 709M) GRADE 250 STEEL PLATE.
3. GALVANIZE FABRICATED RAIL, ANCHOR BRACKET, AND RUB RAIL CONNECTION COMPONENTS IN ACCORDANCE WITH AASHTO M 111M (ASTM A 123M). NO PUNCHING, DRILLING, WELDING OR CUTTING IS PERMITTED ON COMPONENTS AFTER GALVANIZING.

* SEE DTL. DWG. NO. 606-80 FOR SCHEDULE OF GUARDRAIL HARDWARE.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 606

DWG. NO. 606-99

BOX BEAM GUARDRAIL HARDWARE

--REVISED--

EFFECTIVE: JANUARY 2008

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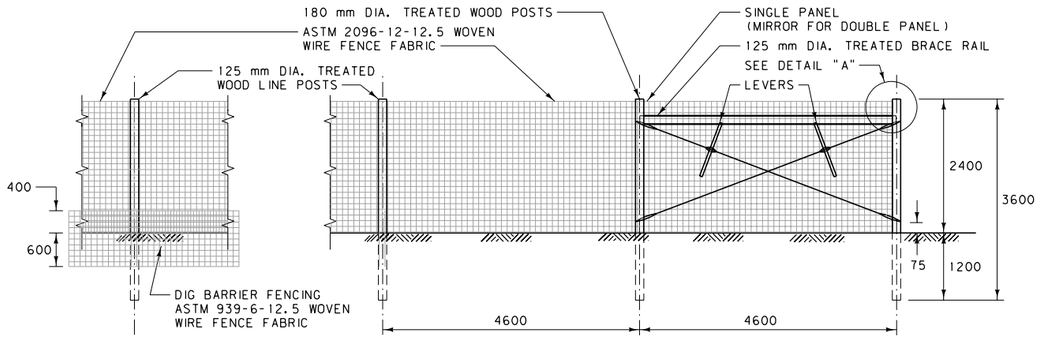
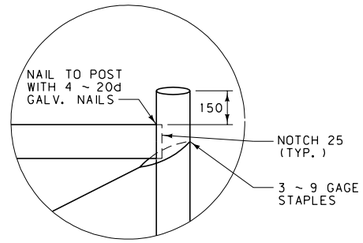


WILDLIFE FENCE W/ DIG BARRIER

PANELS NOT SHOWN

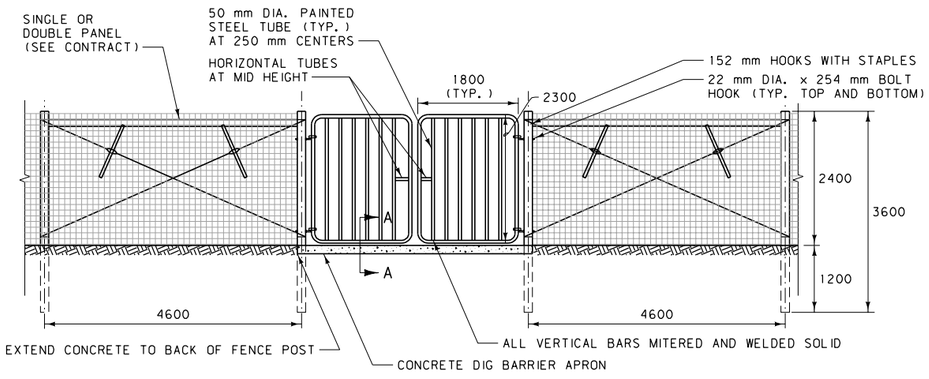
WILDLIFE FENCE



DETAIL "A"

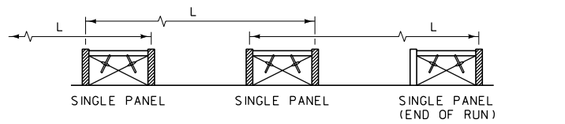
BRACE WIRES - ONE CONTINUOUS 9 OR 12.5 GAGE SMOOTH WIRE DOUBLED TO FORM A FOUR WIRE BRACE. TIE THE TWO ENDS NEAR THE TOP OF THE PANEL POSTS.

LEVERS - 37.5 x 50 x 300 MINIMUM SIZE.



METAL MAINTENANCE ACCESS GATE

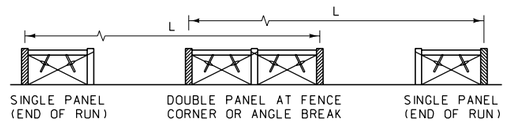
CHAIN AND LOCK TO BE SUPPLIED BY MDT FORCES



FENCE TYPE	RUN = L	PANELS REQUIRED
WILDLIFE	LESS THAN 9.2 m	NONE
	9.2 m - 101.2 m	SINGLE

NOTE:

TIE OFF ON ALL CROSS HATCHED OR SHADED POSTS.



FENCE PANEL TYPES

NOTES:

PLACE ALL FENCE WIRE ON PASTURE SIDE OF POST, EXCEPT ON CURVES. THEN, PLACE THE WIRE ON THE OUTSIDE OF THE CURVE.

POST SPACING IS GENERALLY MEASURED PARALLEL TO GROUND.

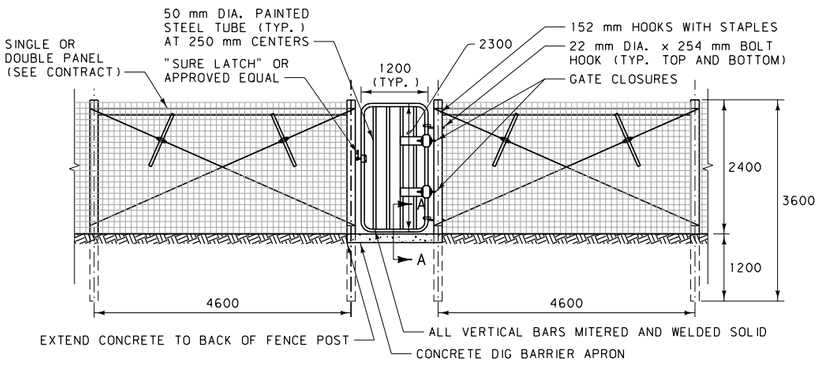
LINE POST SPACING IS 4600 mm CENTER TO CENTER. LINE POST SPACING FROM BRACE OR PANEL POST IS 4600 mm CENTER TO CENTER.

TO ATTACH WOVEN WIRE TO AN END POST, REMOVE TWO OR THREE VERTICAL STAY WIRES FROM THE END OF THE FENCE. PLACE THE FIRST COMPLETE VERTICAL STAY WIRE AGAINST THE POST. START AT THE MIDDLE OF THE HORIZONTAL LINE WIRES, WRAPPING AROUND THE END POST AT LEAST TWO TIMES AND THEN WRAPPING AROUND ITSELF FIVE TIMES.

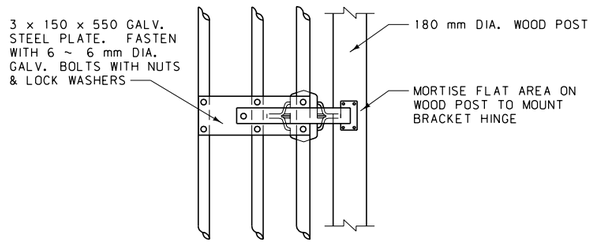
A DEADMAN MAY BE A PRECAST CONCRETE BLOCK, A CAST IN PLACE CONCRETE BLOCK, A ROCK OR OTHER APPROVED OBJECT WEIGHING AT LEAST 120 kg. BURY THE DEADMAN IN THE GROUND WITH AT LEAST 600 mm OF COVER. ATTACH THE DEADMAN TO THE FENCE WITH 3 STRANDS OF 9 GAGE WIRE OR 6 STRANDS OF 12.5 GAGE WIRE. SEE DTL. DWG. NO. 607-10 FOR ALTERNATE DEADMAN.

STAPLE THE BOTTOM, TOP, CENTER AND ALTERNATE WIRES OF WOVEN WIRE TO WOOD LINE POSTS.

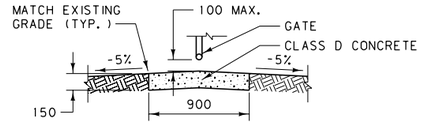
STAPLE ALL WIRES OF WOVEN WIRE TO WOOD CORNER POSTS OR POST USED TO TIE-OFF WIRE.



METAL EQUINE GATE



TIE BAR MOUNTING DETAIL FOR GATE CLOSERS



SECTION A-A

CENTER CONCRETE DIG BARRIER APRON UNDER CLOSED GATE

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 607

DWG. NO. 607-50

WILDLIFE FENCE

--REVISED--
January 2008

EFFECTIVE: APRIL 2006

MONTANA DEPARTMENT OF TRANSPORTATION
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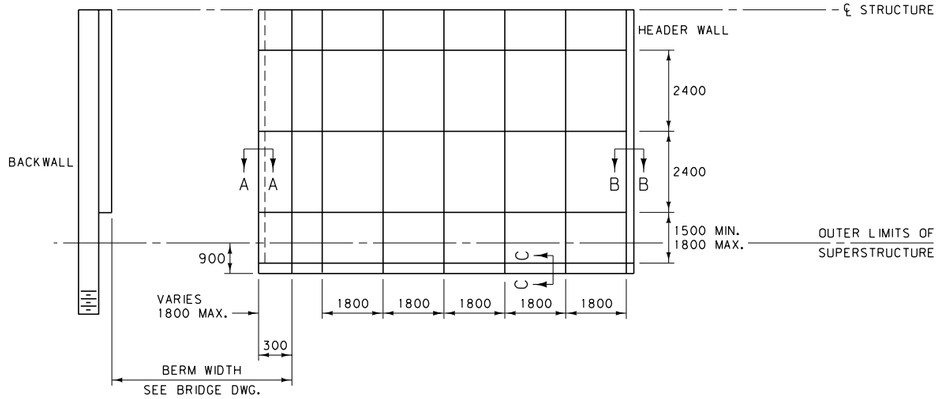
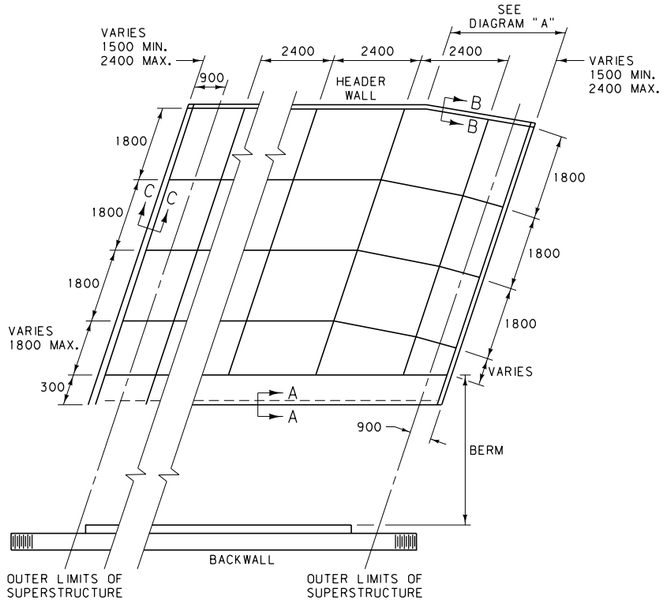


STRAIGHT STRUCTURE



SKEWED STRUCTURE

CAST-IN-PLACE CONCRETE:

LOCATE JOINTS AS INDICATED ON THE PLANS. IF CONSTRUCTION IS STOPPED FOR OVER TWO HOURS, CREATE A CONSTRUCTION JOINT. USE CLASS "D" CONCRETE FOR ALL CAST-IN-PLACE CONCRETE.

USE AN APPROVED 13 mm EXPANSION JOINT FILLER WHENEVER THE CAST-IN-PLACE CONCRETE ABUTS AGAINST ANY PART OF THE BRIDGE STRUCTURE.

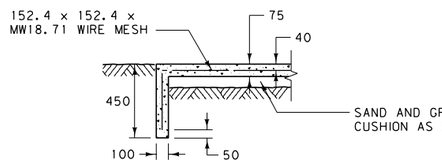
CLEAR THE EMBANKMENT SLOPE OF ALL BRUSH, DEBRIS AND RUBBLE. A CUSHION IS NOT REQUIRED FOR GRAVEL EMBANKMENT SLOPES. FINISH ALL SLOPES TO A REASONABLY UNIFORM SURFACE OR TO THE SLOPE INDICATED IN THE BRIDGE PLANS. COMPACT ALL LOOSE MATERIAL TO THE SATISFACTION OF THE ENGINEER. LEAVE THE ADJACENT SLOPE AREA IN A SMOOTH, UNIFORM CONDITION.

REINFORCING STEEL:

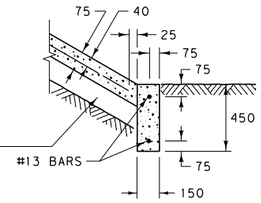
(MAY USE EITHER ALTERNATE LISTED BELOW)

1. #10 BARS AT 250 O.C. (HORIZONTAL AND VERTICAL SPACING) MIN. COVER OF 50 mm
2. 152.4 x 152.4 x MW18.71 WIRE MESH

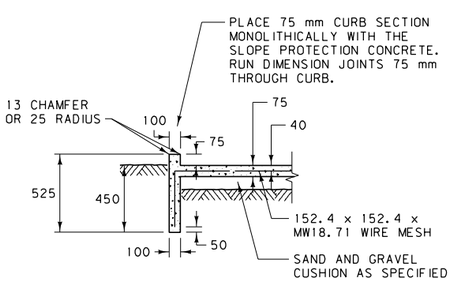
300 mm OVERLAP REQUIRED AT CONSTRUCTION JOINTS FOR REINFORCING STEEL AND WIRE MESH.



SECTION A-A



SECTION B-B
HEADER WALL



SECTION C-C

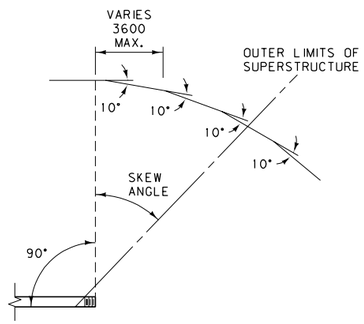
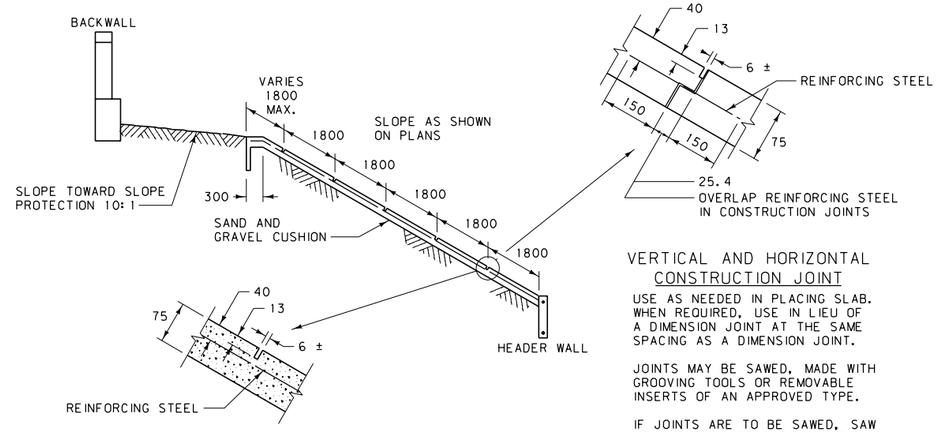


DIAGRAM "A"



VERTICAL AND HORIZONTAL
DIMENSION JOINT

1800 mm VERTICAL SPACING OR AS NOTED. 2400 mm HORIZONTAL SPACING OR AS NOTED. JOINTS MAY BE SAWED, MADE WITH GROOVING TOOLS OR REMOVABLE INSERTS OF AN APPROVED TYPE.

VERTICAL AND HORIZONTAL
CONSTRUCTION JOINT

USE AS NEEDED IN PLACING SLAB. WHEN REQUIRED, USE IN LIEU OF A DIMENSION JOINT AT THE SAME SPACING AS A DIMENSION JOINT.

JOINTS MAY BE SAWED, MADE WITH GROOVING TOOLS OR REMOVABLE INSERTS OF AN APPROVED TYPE.

IF JOINTS ARE TO BE SAWED, SAW JOINTS JUST AFTER CONCRETE HAS SET BUT BEFORE UNCONTROLLED CRACKING OCCURS.

ALL DIMENSIONS ARE MILLIMETERS (mm) UNLESS OTHERWISE NOTED.

DETAILED DRAWING

REFERENCE STANDARD SPEC. SECTION 613	DWG. NO. 613-10

CONCRETE SLOPE PROTECTION

--REVISED--	EFFECTIVE: FEBRUARY 2005
January 2008	MONTANA DEPARTMENT OF TRANSPORTATION
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